















Miss Mary Richardson  
with kind regards from  
10/10/08  
649112  
Dr. H. M. Kyle

# THE DANISH INGOLF-EXPEDITION.

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VOLUME III.

2.

## CRUSTACEA MALACOSTRACA. I.

BY

H. J. HANSEN.

WITH 5 PLATES AND 4 FIGURES IN THE TEXT, 1 CHART, AND A LIST OF THE STATIONS.

TRANSLATED BY DR. H. M. KYLE.



COPENHAGEN.

PRINTED BY BIANCO LUNO.

1908.



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<sup>and Jacob</sup>  
H. J. HANSEN.  
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INVERTEBRATE  
ZOOLOGY  
Crustacea

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Ready from the Press October the 15th 1908.



152  
copy 2  
8 Mar. 1917

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# Crustacea Malacostraca.

By

H. J. Hansen.

## Introductory Remarks.

**I**t will be useful to introduce the treatment of this sub-class with a discussion of various points of importance.

The investigations of the «Ingolf» extended over the eastern part of the seas along the west coast of Greenland from a point a little north of the polar circle to about 58° N. L., two degrees south of Cape Farewell, from there in a north-easterly direction towards Iceland, the waters round this island and between Iceland and the Færoes, lastly eastwards to a line drawn almost due north from the Færoes to Jan Mayen. It goes without saying that all the material brought home by the «Ingolf» is included in the following pages, but I have also thought it right to include all the material which other Danish expeditions, special zoologists or others not experts (officers of the navy or officials in our northern dependency) have collected at Greenland, Iceland and the Færoes, and which is preserved in the Copenhagen Museum; further, I have included the species given in the literature as having been taken within the region mentioned and which are not represented in our Museum, at least from those areas. The waters included are thus the Davis Straits, Baffins Bay and the narrower seas north of this to as near the pole as the «Alert» and «Discovery» reached, the seas south of Greenland to ca. 58° N. L., those along the east coast of Greenland to ca. 75° N. L., the waters west of a line from the Færoes northwards to 68° N. L., 6<sup>2</sup>/<sub>3</sub>° W. L. and from there to Jan Mayen (at ca. 71° N. L., 8° W. L.), the waters south and south-west of Iceland to ca. 60° and the sea south and south-west of the Færoes likewise to about 60° N. L. This work contains all that is known concerning the Malacostraca in the region thus circumscribed, both what our Museum and the literature can show.

Our Museum is rich in Crustacea — especially Malacostraca — from the Færoes, Iceland and especially Greenland, and it may be permitted to mention here the principal sources (apart from the «Ingolf»). At the Færoes, Dr. phil. Th. Mortensen has made a very considerable number of dredgings from low water out to ca. 100 fm.; a number of forms has also been received from Dr. med. F. Jørgensen. At Iceland, collections have been made especially by Dr. phil. A. C. Johansen and Mag. sc. R. Hørring both of whom have also made collections at the Færoes during short sojourns there; Mag. sc. W. Lundbeck has also collected a by no means small material in the Icelandic fjords, and Vice-Admiral C. Wandel has brought home a number of forms from the deep water round Iceland (and from Davis Straits); several others, as Mag. sc. A. Ditlevsen, Cand. mag. B. Sæmundsson,

Mag. sc. H. Jónsson, First Lieutenant in the navy E. Jensen have made smaller contributions. In 1903 and following years Dr. J. Schmidt the leader on the investigation-steamers «Thor» collected a large material of Crustacea, both pelagic and bottom forms, in the waters round the Færoes and Iceland, especially south of Iceland. Dr. Schmidt has brought home a number of Euphausiacea and Mysidacea, as also some Decapoda, which have not previously been taken within the region mentioned.

In my earlier work on the Malacostraca from West Greenland, I have given a complete list of the Danish and Swedish sources from which the material then described was derived; I may therefore merely refer here to that report, published in 1887. Since then, Prof. D. Bergendal (of Lund) and Mag. sc. M. P. A. Traustedt have made a number of dredgings at several places along the west coast of Greenland and have each brought home forms of interest; smaller contributions are due to Captain in the navy C. Ryder, Pastor H. Sørensen and others. Further, considerable tracts along the east of Greenland from ca.  $65\frac{1}{2}$  N. L. to ca.  $74\frac{1}{2}$  N. L. have been investigated by three Danish expeditions, conducted respectively by Capt. in the navy C. Ryder in 1891—92 and by Capt. in the navy G. Amdrup in 1898—99 and 1900. On the first of these expeditions the collections were made by Cand. E. Bay and Cand. med. H. Deichmann, on the last two by respectively Cand. med. K. Poulsen and Mag. sc. Søren Jensen. Lastly, Mag. sc. C. Kruuse has brought home a number of forms from the region about Angmagssalik.

In addition to the mentioned sources of the material dealt with here there is still another, but it must be mentioned by itself. In 1902 Dr. J. Hjort carried out investigations with his steamer «Michael Sars» in the waters between the Færoes and Shetland, also east, south and south-west of the Færoes and to a small extent north-west of these islands. Cand. mag. Ad. Jensen was one of the accompanying naturalists and brought home numerous Crustacea — especially the smaller forms living on hydroids etc. — but the great majority of the class mentioned were collected by Dr. A. Appellöf and taken to the Bergen Museum. A part of this material, which came from the warm area, was at my request kindly handed over to me for investigation and is included in the following pages.

It is a relatively moderate number of species of Malacostraca which have been collected by one or several of the Danish or foreign expeditions which have not likewise been taken by the «Ingolf». On the other hand the «Ingolf» has taken hundreds of species which have not been found by any other within the waters in question, and a large number of these species are also new to science. This with the foregoing explanation is the reason why I have included and endeavoured to collect in one place all that could be found in the Copenhagen Museum and in the literature, in order to throw light on the Crustacean fauna of the waters round our northern dependencies. — My paper on the Malacostraca of West Greenland, published in 1887, was based almost to an equal extent on material belonging to the Copenhagen Museum and to the Riksmuseum in Stockholm; our Museum's part of that material has again been examined along with the material from the «Ingolf». Where many localities are noted in the work mentioned for any species only a summary of these is given here, but if very few localities are mentioned these are again noted; errors in determination are, it need hardly be said, distinctly pointed out.

Under «occurrence» are given the discoveries within the region definitely defined above for the purpose of this investigation; under «distribution» the localities outside this region. Both and especially the distribution have caused the author considerable practical difficulties and some remarks on this subject will for several reasons be of service. All the «Ingolf» localities are mentioned under each species. On the other hand, it would take up far too much space to give all the localities for a number of common species living in shallow water, especially for a no small number of Decapoda; in such cases I have contented myself with summaries for each main section of the coasts. In many cases, however, it is a matter of opinion how much might be usefully included and the correctness of the view adopted may indeed always be combated; some will undoubtedly think that I give too many details, others perhaps that I give too few. While it is difficult enough sometimes to find a suitable mean with regard to how many details based on our own investigations should be given, it becomes still more difficult to determine how much should be noted of the data of other authors concerning the occurrence of any species within the region mentioned. Sometimes the inclusion of such data is superfluous as I myself have seen the species from the same and quite adjacent localities, yet the exclusion of a citation may sometimes be considered as due to lack of knowledge or a slight. In other cases these older data are of doubtful quality — sometimes even the supposed data prove incorrect when the author's specimens are examined — so that the question of their inclusion or omission becomes even more difficult. If I were to indicate all the earlier notices and in every little case of doubt give a criticism, I should certainly succeed in securing myself against the complaint mentioned, but it is very doubtful whether I should advance science by being so unnecessarily prolix. What I include of the literature therefore depends upon personal opinion, but I have endeavoured to give a correct and complete picture for each species.

The distribution both geographical and bathymetric is given for each species. We often meet with a kind of list of the distribution of each species in the literature, but such a list's contents are too often defective, inexact or uncritical. It is defective when the author has passed over older and probably correct data of localities of real interest, it is inexact when the author for example mentions Greenland without distinguishing whether a form is known from one of the two so diverse seas as those at West Greenland and North-East Greenland (from the more southerly East Greenland only a little is known from Angmagsalik). And it is not rarely tangibly uncritical, which is the worst, when one finds in a list statements of occurrence or distribution which depend upon incorrect determinations on the part of the author or his predecessors. In the Decapoda, Mysidacea and two other smaller orders there is fortunately slight possibility of difficulties of this kind, but it is very common in the Tanaidacea for example and especially the Amphipoda. These shortcomings have obliged me, especially for the Decapoda, to undertake a work which I found very great, possibly greater than the matter was worth from the present standpoint of our knowledge, in order to give a somewhat complete and at the same time as far as possible critical report on the geographical distribution of many species — so far as this is known at present. But it has to be added, that there are very few species of which it may be said that our knowledge is complete, the boundaries either in America, or north of Asia, or in the south of Europe or west of Africa being very imperfectly known. It is also the case, at least for a number of species, that the depth at which a given form occurs in one sea is much less than

that at which the same form occurs at least as a rule and often exclusively in another sea. Certain species which are found in the Kara Sea at less depths than 100 fm. are only met with in the cold area of the northern Ocean at several hundred fathoms; thus *Eusirus Holmii* H. J. H. was founded on specimens from 91 and 93½ fm. in the Kara Sea; in the waters N.W. of Spitsbergen the Norwegian North-Atlantic Expedition took it in 260 fm.; in the waters between Jan Mayen, Iceland and Norway the same expedition found it at two stations, the «Ingolf» at seven, and these nine stations were at depths from 293 to 780 fm. In the Kattegat some species occur in shallower water than anywhere round our northern dependencies. It may thus be of importance to know, not only the least and greatest depth at which a species occurs within its territory taken as a whole, but also the limits of depth for its occurrence in different parts of the same territory. Unfortunately gaps probably occur in my account of some species with regard to their occurrence on the Atlantic coast of the Spanish peninsula and at the Canary Isles, the reason being that the necessary literature is not available in Copenhagen.

Some remarks may perhaps be added here on faunistic catalogues. The literature on the Malacostraca is rich in such lists, but unfortunately several and sometimes indeed not a few of the determinations in the most of these works are not to be depended upon and sometimes even demonstrably incorrect. This is just the great danger in using faunistic catalogues, namely, that one cannot be sure in numerous cases that the determination is correct; by carefully using several systematic papers or a single large paper of an author, one gets to know the extent of his carefulness and of his observing and critical abilities, and from this knowledge one may judge of the trustworthiness of his determinations of species, when he has not included in these any remarks on structural features from which one can to a certain extent or with certainty conclude for oneself, whether the determinations are correct. But even the most careful and keen-sighted author does not escape on occasion from making an error in determination, which often cannot be detected at all in a faunistic list. The best list known to me with numerous descriptions of new species are those in the excellent papers of S. I. Smith on the Decapoda of the east coast of North America. Even the list prepared by G. O. Sars on the Crustacea of the Norwegian North-Atlantic Expedition contains several errors, at least as regards the Isopoda and Amphipoda, which he has corrected later in his splendid work, «An Account of the Crustacea of Norway». But when a author so prominent and with such detailed knowledge of Norwegian Crustacea could make several such errors of determinations in a large work like that on the forms of this class taken by the expedition mentioned, confidence in the trustworthiness of faunistic catalogues must decline to a great degree. There are also various lists in which I can place no confidence for a number of species, even though such lists may display many citations and thus show knowledge of the literature, for the reason that this learning is not necessarily accompanied by exact investigation or by critical judgment etc. My confidence in catalogues of species is constantly growing less and less as the years go on, the more so as various journeys have given me the opportunity of finding out very remarkable errors of determination in earlier works on examining the original specimens. It is almost desirable that authors would be less industrious in publishing faunistic lists, especially those on difficult groups and on the fauna of a small stretch of coast, or frequent small additions to older lists.



Nevertheless, I am myself guilty here of publishing a faunistic list. It would, however, be meaningless to give new descriptions of the species (with figures) of all the northern-arctic Decapoda, most of which have been described several or even many times, and for example to describe and figure the Cumacea, Isopoda and Amphipoda which have been so excellently dealt with in Sars' standard work mentioned above. But wherever on going through my large material I have met with a noteworthy difference between my specimens and the work noted by me as the chief publication regarding the species in question, I have displayed the differences discovered by notes and often likewise by figures, so that a possible error of determination may be controlled by a successor, who in one or other regard has better material or more critical ability. With this object in view I have marked with ! the work or the two works for each species which contain the best description of the form; also, under «remarks» I have sometimes briefly mentioned one or several of the principal specific characteristics. I have thus done what I could to give the users of this work the greatest possible control as regards my own determinations, and hope further that these measures of circumspection may be a good example to others who in future wish to publish faunistic catalogues of Crustacea.

With regard to species which have been described several or many times it has seldom been my intention to refer to all the previous descriptions and figures in the synonymy list. I only give a greater or less selection which always contains the first description and the one or two best (marked as mentioned above). In the synonymy list no reference is ever given to mere lists of names, and reference is only made to a work if it contains either a description or a figure or at least remarks of importance for the recognition of the species. I may add, that I have always used the works cited under each species, except in the cases where these were not available and then I mention the source of my citation. It is very common to find that authors give citations of descriptions of a species and of localities, where these are only mentioned in the same way, so that one cannot see whether there is in the work cited only a name and some localities or likewise a description; in this way the synonymy list swells up to an unreasonable extent and at the same time becomes not nearly so reliable or so useful as a list much shorter but carefully chosen. Another and not very rare bad habit is that an author, in a synonymy list for example, cites a treatise he either does not know or has not looked at in the case in question, but has copied it from another's list; it happens that such slackness can be detected, when the author in his citation includes the written or printed error found in the citation of his predecessor by a third person. Under «occurrence» and «distribution» I have generally given for each locality or small group of localities the author or the authors as the source of information but not mentioned the works; and except where the contrary is stated I have everywhere examined the source myself. It is only when I have studied specimens from the same coast that I omit frequently any reference to earlier notices; where therefore no author is named for a locality or for several localities mentioned immediately after one another, that means that our Museum owns the species in question from these localities.

For a large number of the earlier described species I have given the length — sometimes also other measurements — of the largest specimen seen by me, as also the place where it was taken; in several cases these sizes are greater than those hitherto known for the species in question. For some

forms there has been occasion to describe changes in the size of the species according to the localities with a little more detail.

It is not possible at this place to give the more general results which may be deduced from the following account of the data. When the Malacostraca (and in the end all Crustacea) are completely worked out, it will be possible to give a summary such as that mentioned and to base it securely on references. A few introductory remarks will be given for the separate orders, but on the other hand it has been considered unnecessary to give lists of the literature.

Lastly, the author wishes it to be distinctly understood that his beginning with the Decapoda does not mean that he considers them higher than the other orders. The arrangement of the orders has nothing to do with this question, as it has been chosen out of regard for considerations which have nothing to do with the systematic arrangement of the Crustacea, namely, such as were imposed by the work itself and which tended only to make a convenient subdivision of the work for the author and for publication.

## I. The Order *Decapoda*.

Although the order Decapoda could very naturally in my opinion embrace the *Euphausiacea* the distance between *Euphausia* and *Sergestes* and *Peneus* not being greater than that between *Peneus* and *Homarus* or between *Homarus* and *Dromia*, yet I have placed the Euphausiacea here as an order by themselves.

It seems to be an insoluble task to divide this order in a perfectly natural manner into suborders. Some authors hold to the old division of Brachyura, Anomura and Macrura (to which the Euphausiacea might thus be added as a fourth suborder); the division is very practical but not of great scientific value. Other authors accept the division made by J. E. V. Boas in 1880 into Reptantia and Natantia. That these two names are in themselves badly chosen is naturally of minor importance if the division otherwise were good. It should be noted, however, that the great majority of the Natantia are bottom-animals, some even live in holes in coral blocks or in sponges; it is also interesting to notice that the few genera, whose representatives really swim in the upper or deeper water-layers, always so to speak possess peculiar characteristics; thus the two posterior pairs of thoracic legs in *Sergestes* are modified to true swimmerets while *Pasiphaë*, *Hymenodora* and *Acantheephyra* have retained in use the outer branches of the thoracic legs; lastly, *Polybius Henslowi* which belongs to the Reptantia and lives a true pelagic life has all four pairs of its walking legs transformed to swimmerets. But, for the rest, I may spare myself the trouble of giving further proof of the bad quality of the two diagnoses, each with ca. 30 characters, which Boas sets up for his two suborders mentioned. In «Germanisering af Dansk Videnskab», Copenhagen, 1895, I have reviewed each of the characters in question one by one and showed that of all the 30 characters there is only one (or perhaps 1½) which really holds good — and in the same year the quality of the character left was criticised by Th. List.

In my opinion it will prove impossible to divide the order Decapoda into 2, 3 or 4 suborders

in a completely satisfactory manner, but on the other hand one can set up a long series of excellent groups with one to several families in each group. Meanwhile, for the sake of a general view, the old division into Brachyura, Anomura and Macrura is retained.

The "Ingolf's" catch of Decapoda was relatively not large; the northerly seas, as is well-known, are tolerably poor in species of this order. Nevertheless, the following account will give an important addition to the geographical distribution towards the north of a number of the deep-water forms known from somewhat more southerly regions of the Atlantic. Especially interesting in this regard is a comparison with the fauna known, as the result of the American deep-water investigations and S. I. Smith's excellent descriptions, from the tract between ca. 35° and 45° N. L. off the east coast of America. It appears that most of the deep-water species collected by the "Ingolf" outside of the cold area are noted by Smith from the region mentioned, but this author has certainly three to four times as many species as the "Ingolf". The Danish ship has not made nearly so many hauls in deep water on bottom with positive temperatures as the Americans; if we had had several times more dredgings from the waters south of southerly Greenland, we should quite certainly have obtained many more of the species known from about 40° N. L., but I doubt whether we should have got much more than the half of Smith's species. Although the investigations are thus far from sufficient to show the true extent of the decapod deep-water fauna of the most northerly parts of the Atlantic in comparison with that of more southerly latitudes, yet the following account will give very interesting and new information regarding the distribution of a number of more southerly species far to the north in deep-water areas, the coastal fauna of which has a somewhat arctic character. On the other hand, it can be said that of the Decapoda living from the beach down to ca. 200 fm. in the waters round Greenland and Iceland as also on the north and west sides of the Færoes extremely few species will be discovered in future which are not dealt with in this work. More exact knowledge however may naturally be gradually obtained of the geographical and bathymetric distribution of the various species within the region mentioned, and especially a much more complete knowledge than the present concerning the temperature occurring at the coldest and in the warmest periods of the year in the depths in which the species live at their different localities.

After these remarks this may perhaps be a suitable place to insert some critical notes on an apparently somewhat variable yet very wide-spread view regarding what is meant by arctic and boreal or subarctic, that is, on the zoogeographical question concerning the fauna, both coastal and deep-water fauna, in the more northerly seas of the globe. It is in other words the marine Arthropoda in the great, as yet incomplete, work *Fauna Arctica* published by F. Römer and F. Schaudinn — which requires a closer investigation. Most of the contributions published hitherto (1906) are almost entirely compilations, as the material the various contributors have had from the "Helgoland" Expedition is comparatively speaking extremely small. One of the carcinological papers in this work is almost quite useless, and of others it may be said that their plan and execution are so unfortunate that they will certainly contribute more to confuse than to clear up the ideas on arctic and boreal fauna in the minds of the majority of the Zoologists who may use them. I was led into this literary investigation by becoming acquainted with Dr. F. Doflein's treatment of the Decapoda in "*Fauna Arc-*

tica" (B. I, p. 313—62), and it will not be denied that I have the most valid reasons possible for making a very detailed reference to this work, which deals with all the Decapoda taken north of 60° N. L. and likewise includes a number of forms only taken much farther south. Further, in an extensive foot-note I shall make some remarks on one of the other papers so far published on the Arthropoda in "Fauna Arctica", namely, the work on the Pantopoda; this latter work is in one way excellently suited to serve as a type and there are also special reasons for mentioning it more particularly, as the work on the "Ingolf's Pantopoda is referred to in it.

As an introduction to my remarks on the part of "Fauna Arctica" which concerns me most, the following may be mentioned. A destructive criticism of the principle underlying the choice of the boundary between arctic and boreal fauna, which is followed by H. Ludwig in his treatment of the Holothurida (and Asterida) in the work mentioned, has come from Dr. Hj. Östergren (Bergens Museums Aarbog 1902, No. 9). Östergren states, that Ludwig has simply taken the polar circle (i. e. 66 $\frac{2}{3}$ ° N. L.) as this boundary-line, whereas it has long been known, that on the American coast Cape Cod at 42° N. L. forms the boundary between the arctic and the boreal coastal fauna, and on the other hand the west coast of Norway and its fjords right up to the North Cape, 71° 10' N. L., has an essentially boreal fauna both as regards even the more littoral (0—50 fm.) and especially the areas in deeper water (100—400 to 500 fm.). He does not enter into details regarding the more littoral fauna from the North Cape to Nova Zembla. The geographical boundaries for the true deep-water fauna are entirely different, as the cold area of the Northern Ocean with bottom-temperatures under 0° C. extends between the ridge off Norway on the one side and Iceland and the Færoes on the other, then in between the Færoes and Scotland almost to 60° N. L. (the boundaries of the cold area can be seen in the work on the Norwegian North-Atlantic Expedition), and with Östergren one may suitably choose 0° C. as the boundary for the arctic deep-water fauna. It may be recalled here that we find positive bottom-temperatures to the west of the cold area, and the deep water of the Atlantic with a part of its fauna pushes up into Denmark Straits and Davis Straits.

Ludwig's work is chiefly a compilation, and Östergren shows a number of errors of different kinds and origin. But Ludwig in the opinion of Zoologists expert in his subject has published extremely valuable systematic papers on Holothurida etc., whilst several of the other contributors to "Fauna Arctica" have certainly known comparatively little of the groups on which they wrote, a fact which now and then is not without some influence on the compilation.

We may turn now to the consideration of Doflein's work on the Decapoda. On p. 316 the author writes: "Ich habe mich — — — zu einem Kompromiss entschlossen, indem ich diejenigen dekapoden Krebse aufführe, welche die Meere nördlich von 60° n. Br. regelmässig beherbergen; dabei habe ich aber die Angehörigen arktischer Familien, welche sich infolge von besonderen Verhältnissen weiter nach Süden ausbreiten, mitberücksichtigt, so besonders die Bewohner der Kaltwassergebiete an der Ost- und Westküste von Nordamerika. Haben doch die Erfahrungen der letzten Jahrzehnte bewiesen, dass Tiefseeformen südlicher Gebiete nicht selten das Flachwasser der kalten Zonen bewohnen; — — —". If the "südliche Gebiete" mean the Gulf of Gascogne or the region explored by the "Travailleur" and "Talisman", it will be extremely difficult and probably impossible, to show a single

species of Malacostraca which occurs as a deep-water form within these parts of the Atlantic and at the same time in "das Flachwasser der kalten Zonen". Using the statement cited as basis Doflein has included a number of species of Lithodinæ, even two which are only known from San Francisco in California. It is thus unfortunate for him that no species of the group Lithodinæ is arctic, not even *Lithodes maja*, which is not littoral, nor so far as I know found anywhere in negative bottom-temperatures. It is a typically boreal species which extends into the Murman Sea and has been taken west of Bear Island, in nearly 100 fm. and at West Spitzbergen. This being the case, Doflein's long list of Lithodinæ can only serve to confuse the view. His "Uebersicht der horizontalen und vertikalen Verbreitung der arktischen Decapoden" (p. 359) in which there should only be "die sicheren und im arktischen Gebiet nachgewiesenen Arten" contains for example several typical Atlantic forms, which are neither arctic nor taken in arctic waters, as will be shown later in dealing with the separate species.

We read on p. 360: "Die Schriften von Hansen waren mir leider unzugänglich"; at the same place however he gives the titles of the two largest of my (3) papers, which are of special importance here, namely, the paper in the "Djimphna" Expedition and that on the Malacostraca of West Greenland. These two papers are however sometimes found to be on sale in German second-hand book-sellers' shops (according to their catalogues) and in any case they are still the principal works on all the Malacostraca from the waters along West Greenland (60°—73° N. L.) and the Kara Sea, which two seas ought to have had some interest for the author. Had he obtained these papers he would have been able to escape for example so patent an error as is contained in almost all his statements on *Sclerocrangon salebrosus*. He has also been unfortunate however with a fourth of my papers. He has, namely, two species of *Sergestes* and refers in the synonymy list under *S. Meyeri* Metzg. to my work in the Proc. Zool. Soc. 1896, but as he does not mention what I have stated about *S. Meyeri* nor the page, he has obviously not seen my paper, and I must suppose that the Proceedings Zoolog. Society of London have also not been available to him. His lack of knowledge of my paper has however brought misfortune to him, as I show in it that the two species he constantly gives as distinct are identical and should have the name of the second, *S. arcticus* Kr. Again, in 1858 M. Sars wrote concerning *Stenorhynchus rostratus* L. that "in the north it does not reach to Greenland", and concerning *Carcinus manas* that it "is lacking at Greenland". Under both species Doflein (p. 351 and 355) cites this very work of M. Sars ("Oversigt over de i den norsk-arctiske Region forekommende Krebsdyr", Videnskabselsk. Forhandl. for 1858) as the source for the statement that they were taken at Greenland. One might here indeed blame M. Sars for causing a future eager compiler in his haste to read wrongly, because the word "Greenland" was named under these species. Dr. Doflein says in his "Einleitung" concerning the literature: "Wenn ich trotzdem keine absolute Vollständigkeit erreichen konnte, wovon ich überzeugt bin — — —", this his conviction has been in great degree correct — but one is then tempted to wonder whether, when such an extremely voluminous work of compilation is found in place after place to be uncritical, inaccurate or defective, there is not a great probability of its doing more harm than good. In the following pages it will be necessary for me to show various other inaccuracies in Doflein's work so as to contribute to their eradication. His remarks on *Sabinea septemcarinata* Sab. and *S. Sarsii* Smith (p. 328), on *Hippolyte spinus* Sow., *H. Phippsii* Kr.

and *H. macilentus* Kr. show that his investigation of nature is not any deeper or more trustworthy than of the literature<sup>1</sup>.

## A. Brachyura.

### 1. *Stenorhynchus longirostris* Fabr.

1775. *Cancer longirostris* J. C. Fabricius, Syst. Entom. p. 408.

! 1863. *Stenorhynchus longirostris* Heller, Crust. südl. Eur. p. 23, Taf. I, Fig. 1-2.

1900. — — A. M.-Edwards & E. L. Bouvier, Exped. Scient. du Travailleur et du Talisman, Crust. Dec., I, p. 156, Pl. XXII, fig. 6.

Occurrence. The "Ingolf" has not taken this species, but it is to hand from two other sources. Færoe Bank (Dr. Jørgensen); 1 specimen.

— — 60° 55' N. L., 8° 56' W. L., 69 fm., temp. 9.3° ("Michael Sars", 1902); 1 spec.

The first-named bank is most probably the same as the second; it lies south-west of the Færoes.

Distribution. The locality just mentioned is the most northerly hitherto observed for the distribution of this somewhat southerly species. It was known previously however from 59° 12' N. L., 5° 57' E. L. (Norman), from the Shetland Isles (Norman), the Hebrides (Norman), further south in the Irish Sea (Walker), Cornwall and Devon (Norman), and places on the east coast of England, North-

<sup>1</sup> In "Fauna Arctica" B. II (p. 35-94) is found "Arktische und subarktische Pantopoden. Zusammengestellt von K. Möbius". In the "Allgemeiner Teil" (p. 38) we read: "— — Michael Sars und G. Ossian Sars, sowie nach ihnen viele andere Faunisten des nordöstlichen Atlantischen Oceans betrachten den nördlichen Polarkreis als Grenzlinie zwischen dem Wohngebiet der arktischen und subarktischen Seetiere"; the number after G. O. Sars' name refers to a footnote which gives the title of *Mollusca Reg. arct. Norveg.* 1878. But in the cited work of Sars of 1878 this excellent author does nothing of the kind; on the contrary, he states (p. 2) that "the whole of the deep region along our southern and northern coast to North Cape thus belongs undoubtedly to the warm area, and the ice-cold water which fills the great basin below 300 fm. in the ocean lying beyond right to the level of Stadt (ca. 62° N. L.) is everywhere marked off from the coast by the long extended barrier — —". This citation alone is surely sufficient to prove that Sars in 1878 already did not set the boundary "zwischen dem Wohngebiet" of the arctic and boreal marine animals at the Polar Circle. Sars did something quite different; he investigated the character of the fauna at the different places and then determined where it was arctic and where not. He brought into his work the forms found on the Norwegian coast north of the Polar Circle, but he showed that the fauna in deeper water along the west coast of Norway right to the North Cape was indeed not arctic. It is possible — though certainly extremely doubtful — that "viele andere Faunisten des nordöstlichen Atlantischen Oceans" have in the period from 1878 to 1900 considered the northern Polar Circle as the boundary between "dem Wohngebiet" of the arctic and boreal marine forms; if so, then these "Faunisten" have shown almost as little acquaintance with what they were writing about as a number of the authors in "Fauna Arctica". — Even if G. O. Sars had written in 1878 what K. Möbius ascribes to him, it would still never be permitted to retain such a view in our time after the publication of the Norwegian North-Atlantic Expedition Report and of the Hydrography in the "Ingolf" Expedition Report. In spite of some speculation I have not succeeded in understanding how any one could formulate the principle which the author employs in the elaboration of the lists given p. 41, on "rein arktische Pantopoden" and on those that are "Arktisch und subarktisch". The species which the "Ingolf" has taken in deep to very deep water with positive bottom-temperatures round the southern part of Greenland are noted as "arktische", if they are not known from more southern regions, otherwise as "arktische und subarktische" — and in both cases the procedure is perfectly incorrect. Thus, for example, *Pallene acus* Mein., *Pallene hastata* Mein. and *Pallenopsis plumipes* Mein. are made "rein arktische", but *Paranymphe spinosus* Caull., *Colossendeis colossea* Wils. and *C. macerrima* Wils. arctic and subarctic — in both cases quite incorrectly, as all 6 species are deep-water species in the Atlantic. Some of them were taken earlier much more to the south than by the "Ingolf", and all 6 might be expected to be distributed in the greater part of the Atlantic, a few even perhaps in the Pacific, but such species could not easily be considered either arctic or subarctic, just as little as the deep-water Decapoda taken at South Greenland mentioned in this work, for example, the two species of *Polycheles*, *Galacantha rostrata*, etc. That Möbius should make such references is all the more strange as, following Meinert, he gives both depth and bottom-temperature for the 6 species named. Such references can only do harm. — For the rest the work seems to be a careful summary of the literature and localities; the original contributions — in the form of remarks on some species — are, in agreement with the title of the treatise, extremely few; the whole might best be considered as almost superfluous literature of rather less use than the reverse.



umberland (Norman), S. E. from Yarmouth (Metzger), Belgium (v. Beneden), on the English-Normandy Islands (Koehler), Concarneau (Bonnier), Gulf of Gascogne and further south to the Canary and Cape Verde Islands to  $17^{\circ}$  N. L. (A. M.-Edwards and Bouvier). It also occurs in the Mediterranean (Heller, Gourret, Adensamer etc.) and is said to occur in the Black Sea (Czerniavsky, teste Ortmann).

Concerning its bathymetric distribution the following may be said. Bonnier states that it occurs in depths from ca. 5 to 30 fm. on the coast of Brittany; Heller gives 25 to 40 fm. for the Mediterranean, Gourret ca. 10 to 33 for Marseilles Bay, Adensamer 54 to 62 fm. for the Adriatic Sea, Caullery 96 to 212 fm. for the Gulf of Gascogne, A. M.-Edwards & Bouvier 41 to 223 fm. for several places in the Atlantic (Cadiz to Cape Verde Islands), lastly 870 fm. for a single specimen taken off Morocco. The last I consider as improbable until further information is forthcoming, and believe that it has arisen from some error or another (e. g. that the specimen has been in the trawl from an earlier station). Apart from this it appears that the species occurs uniformly at all depths from ca. 5 fm. to a little over 200 fm., but that it is more rarely found in shallower water than 10 to 20 fm.

## 2. *Lispognathus Thomsoni* Norm.

1873. *Dorynchus Thomsoni* Norman, in Wyv. Thomson, Depths of the Sea, p. 174, fig. 34.  
 1886. *Lispognathus* — Miers, Challenger Brachyura, p. 28, Pl. V, fig. 2.  
 — — — S. I. Smith, Rep. Comm. Fish and Fisher. f. 1885, p. 18, Pl. I, figs. 1—1 a.  
 1900. — — — A. M.-Edwards & E. L. Bouvier, Exped. Scient. du Travailleur et du Talisman, Crust. Dec., I, p. 146, Pl. III, figs. 8, Pl. XXI, fig. 8—14.

Occurrence. The "Ingolf" has taken this species at the following 10 stations.

West of Iceland:	St. 97:	$65^{\circ} 28' \text{ N. L.}, 27^{\circ} 39' \text{ W. L.},$	450 fm.,	temp. $5.5^{\circ};$	4 spec.
— - —	- 90:	$64^{\circ} 45' - 29^{\circ} 06'$	— 568 —	— $4.4^{\circ};$	2 —
— - —	- 89:	$64^{\circ} 45' - 27^{\circ} 20'$	— 310 —	— $8.4^{\circ};$	1 —
— - —	- 9:	$64^{\circ} 18' - 27^{\circ} 00'$	— 295 —	— $5.8^{\circ};$	2 —
South-West of Iceland:	- 81:	$61^{\circ} 44' - 27^{\circ} 00'$	— 485 —	— $6.1^{\circ};$	12 —
— - —	- 84:	$62^{\circ} 58' - 25^{\circ} 24'$	— 633 —	— $4.8^{\circ};$	3 —
— - —	- 73:	$62^{\circ} 58' - 23^{\circ} 28'$	— 486 —	— $5.5^{\circ};$	14 —
South of Iceland:	- 7:	$63^{\circ} 13' - 15^{\circ} 41'$	— 600 —	— $4.5^{\circ};$	1 —
— - —	- 54:	$63^{\circ} 08' - 15^{\circ} 40'$	— 691 —	— $3.9^{\circ};$	2 —
— - —	- 57:	$63^{\circ} 37' - 13^{\circ} 02'$	— 350 —	— $3.4^{\circ};$	2 —

It has also been taken at:  $64^{\circ} 42' \text{ N. L.}, 27^{\circ} 43' \text{ W. L.},$  426 fm., temp.  $6^{\circ},$  2 spec. (Wandel);  $62^{\circ} 57' \text{ N. L.}, 19^{\circ} 58' \text{ W. L.},$  ca. 500 fm., "Thor" 1903.

Distribution. All the localities of the "Ingolf", Wandel and "Thor" lie west and south of Iceland; the depth is between 265 and 691 fm., the temperature from  $3.4^{\circ}$  to  $8.4^{\circ}$ . The species was originally taken in the warm area in the Færoe Channel (Wyv. Thomson), later S. W. of Ireland, 250 fm. (Pocock), in the Gulf of Gascogne, 346—750 fm. (Caullery), also in the Atlantic from the Bay of Biscay, Portugal, Morocco, the Azores, the Canary and Cape Verde Islands in 120 to 1106 fm. (A. M.-Edw. & Bouvier); in the Mediterranean at the level of Marseilles (A. M.-Edwards) and a number of places in the Adriatic

in 330—670 fm. (Adensamer). It has been taken off the east coast of America at a little below 40° N. L., 225—318 fm. (Smith), if Smith's determination is correct; A. M.-Edwards & E. L. Bouvier (op. cit. p. 151) namely considered a form taken by the "Blake" at Grenada as belonging to an independent species, *L. furcillatus* A. M.-E., and the specimens mentioned by Smith belong to *L. furcillatus* A. M.-E., so that the question arises whether *L. furcillatus* is only a variety or an independent species. In the "Challenger" *L. Thomsoni* is given from the Agulhas Bank, South Africa, 35° 4' S. L., 18° 37' E. L., 150 fm. Doflein states that it has been taken several times in the waters off Cape Colony in so small depths, as 56, 82 and 168 fm., further in the Indian Ocean at St. Paul, Sumatra and East Africa in depths from 357 to 459 fm. Miers did not venture to separate a specimen taken near Sydney in 410 fm. as specifically distinct from *L. Thomsoni*, but this statement of its occurrence at New Holland requires further confirmation.

If it should be confirmed by the investigations of a Zoologist who is an excellent judge of species that the determinations from all the localities mentioned are correct, this species must have an extremely wide distribution. It occurs as a rule in depths between ca. 250 and 700 fm., though met with at a little less than 60 fm. and down to ca. 1130 fm.

### 3. *Scyramathia Carpenteri* Norm.

1873. *Amathia Carpenteri* Norman, in Wyv. Thomson, The Depths of the Sea, p. 175, fig. 35.  
 ! 1885. *Scyramathia* — G. O. Sars, Norske Nordhavs Exped., Crust. I, p. 6, Pl. I, figs. 1—7.  
 1894. — — A. M.-Edwards & Bouvier, Rés. des Camp. sc. de l'Hirondelle, fasc. VII, p. 13.  
 ! 1900. — — A. M.-Edwards & Bouvier, Exped. Scient. du Travailleur et du Talisman, Crust. Dec., I, p. 133, Pl. XX, figs. 1—10.

Occurrence. The species has not been taken by the "Ingolf", but by later expeditions:

South of Iceland: 62° 57' N. L., 19° 58' W. L., 500 fm., ("Thor" 1903); 1 spec.

South-West of the Færoes: 61° 15' N. L., 9° 35' W. L., 500 fm., ("Thor" 1904); 2 spec.

— — — 61° 7' — 9° 33' — 425—460 fm., ("Michael Sars" 1902); 1 spec.

— — — 61° 08' — 9° 28' — 450 fm., ("Thor" 1903); 1 spec.

— — — 59° 28' — 8° 1' — 580—687 fm., ("Michael Sars" 1902); 8 spec.

Distribution. This species was originally taken on the so-called "Holtenia ground" in the warm part of the Færoe Channel (Wyv. Thomson). Later it was taken between Norway and the Shetlands at 61° 41' N. L., 3° 19' E. L., 220 fm. (G. O. Sars); S. W. of Ireland in 110—250 fm. (Pocock); the Gulf of Gascogne in 345 and 511 fm. (Caullery); at the Azores in 450 to 620 fm. (A. M.-Edwards & Bouvier); at various places along the south-west coast of Europe and the north-west coast of Africa, from the Gulf of Gascogne to the Canary Isles and even more southerly to 25° 39' N. L., 18° 22' E. L., in depths from 186 to 724 fm. (A. M.-Edwards & Bouvier).

### 4. *Chionoecetes Opilio* O. Fabr.

1780. *Cancer Phalangium* O. Fabricius, Fauna Groenlandica, no. 214, p. 234.  
 ! 1788. — *Opilio* O. Fabricius, Nye Saml. af Kgl. D. Vid. Selsk. Skr., 3. Deel, p. 181, med 1 Tavle.

1838. *Chionoecetes Opilio* Kroyer, Nat. Tidsskr., B. II, p. 249.

1849. — — — Voy. en Scand. etc., Crust. Pl. I.

1856. *Peloplastus Pallasii* Gerstaecker, Arch. f. Naturgesch., 22. Jahrg., B. I, p. 105, Pl. I, fig. 1.

1893. *Chionoecetes Opilio* M. Rathbun, Proc. U. S. Nat. Mus. Vol. XVI, p. 74, Pl. IV, figs. 5—7 (gives the synonymy, but incompletely).

1894. — — — A. M.-Edwards & Bouvier, Res. des Camp. sc. de l'Hirondelle, fasc. VII, p. 16.

Occurrence. This species has been taken by the "Ingolf" at the following locality.

Davis Straits: St. 31: 66° 35' N. L., 55° 54' W. L., 88 fm., temp. 1.6°; 1 spec.

In Malac. Groenl. (p. 28) I have enumerated some localities on the west coast of Greenland; since then I have seen specimens from Ritenbenk, Jakobshavn, Godhavn, Akudlek 30—60 fm. and Holsteenborg. A summary of our knowledge of its occurrence at West Greenland would read: it is known between 66° 56' N. L. and 70° 42' N. L. from the beach to 350 fm. (the last-mentioned depth, which is very unusual, according to information from Dr. Forsstrand).

Distribution. This species has not been found east of Cape Farewell. It is thus not known from East Greenland nor from the seas north of Europe and Asia; it is only on the north-eastern part of Asia near Behring Straits that it begins at ca. 173° 24' W. L. (Stuxberg). Off the east coast of America it is common at Newfoundland (A. M.-Edw. & Bouvier) and goes down to Nova Scotia and further to Casco Bay, Maine (S. I. Smith). Miss M. Rathbun gives a large number of localities for it from the waters on the north-western part of North America and summarises its occurrence there as follows: "from the Arctic coast of Alaska southward through Bering Strait and along the eastern and western shores of Bering Sea to the Aleutian Islands, where it is found in abundance, and thence eastward and southward along the Alaskan coast to British Columbia". Further: "It ranges in depth from shallow water to 206 fathoms on the Atlantic coast and 121 fathoms on the Pacific."

It may not be useless to point out distinctly here, that when A. M.-Edwards & Bouvier (l. c. p. 17) begin a summary of the distribution of this species with "Cette espèce n'est pas rare dans les mers froides de l'Europe...", this statement is quite incorrect.

Remarks. The largest specimen I have seen is from Jakobshavn; the carapace is 138.5 mm. long and 141.5 mm. broad, the second leg from the margin of the carapace to the tip 338 mm.

## 5. *Hyas araneus* L.

1758. *Cancer araneus* Linné, Syst. Nat. Ed. X, I, p. 628.

1780. — — — O. Fabricius, Fauna Groenl. n. 213, p. 233.

1838. *Hyas araneus* Kroyer, Kgl. D. Vid. Selsk. naturv. math. Afh. Syvende Deel, p. 314.

! 1851. — — — Brandt, Krebse, in Middendorffs Sibir. Reise, B. II, 1, p. 79—80.

! — — — coarctatus Hoek, Crust. "Willem Barents", Nied. Arch. f. Zool. Supplb. I, p. 3, Taf. I, Fig. 1.

Occurrence. The "Ingolf" has taken this species at the following localities.

Baffins Bay: St. 33: 67° 57' N. L., 55° 30' W. L., 35 fm., temp. 0.8°; 1 spec.

Davis Straits: Holsteenborg Havn, in fishing net; 1 spec.

— St. 31: 66° 35' N. L., 55° 54' W. L., 88 fm., temp. 1.6°; 1 spec.

Davis Straits: St. 29:  $65^{\circ} 34' N. L.$ ,  $54^{\circ} 31' W. L.$ , 68 fm., temp.  $0.2^{\circ}$ ; 1 spec.

Dyre Fjord, Iceland; many spec.

North-West of Iceland: St. 129:  $66^{\circ} 35' N. L.$ ,  $23^{\circ} 47' W. L.$ , 117 fm., temp.  $6.5^{\circ}$ ; 1 spec.

North of Iceland: St. 127:  $66^{\circ} 33' N. L.$ ,  $20^{\circ} 05' W. L.$ , 44 fm., temp.  $5.6^{\circ}$ ; 1 spec.

Reykjavik, in the harbour; 3 large spec.

North-West of the Færoes: St. 1:  $62^{\circ} 30' N. L.$ ,  $8^{\circ} 21' W. L.$ , 132 fm., temp.  $7.2^{\circ}$ ; 1 spec.

In Malacostr. Groenl. (p. 30) I have brought together a number of localities from the west coast of Greenland, and the most northerly of these is Godhavn, at  $69\frac{1}{4}^{\circ} N. L.$ , the most southerly is Godthaab, at  $64^{\circ} 11' N. L.$ ; the species was taken in 5 to 100 fm. Later investigations have not brought any new data of interest so far as West Greenland is concerned; at East Greenland and Jan Mayen it has not been found. I have seen a large number of specimens from numerous places on the western, northern, eastern and south-eastern coasts of Iceland; the species is there extremely common, as a rule at ca. 5 to 40 fm.; it is likewise common at the Færoes.

**Distribution.** From the Færoes the species extends southwards to the Shetlands (Norman) and the coasts of Scotland, England and Ireland (Bell, Walker, etc.); it does not seem to have been observed on the west coast of France, but on the other hand it occurs at the Channel Islands (Koehler) and as it is given by H. Milne-Edwards from France it must certainly occur on its north coast; further at Belgium (v. Beneden), Heligoland and several other places in the southern half of the North Sea (Metzger, Meinert), in the Kattegat and northern part of the Sound (Meinert), along the coasts of Norway (M. Sars), at Bear Island and Spitzbergen (G. O. Sars, Doflein, Birula), in the White Sea, along the whole north coast of Europe, in the northern part of the Murman Sea (Knipowitsch); at the eastern end of Jugor Schar (Hansen), at the east coast of Nova Zembla (Stuxberg) and even in the Kara Sea at ca.  $60^{\circ} E. L.$  Beyond the last-named locality and along the north coast of Asia as far as  $177^{\circ} 41' E. L.$ , that is, a distance of over 100 degrees of longitude, it is not known. On the other hand it occurs along the most easterly part of the north coast of Asia from  $177\frac{2}{3}^{\circ} E. L.$  to East Cape (Stuxberg)<sup>1</sup> and in the Sea of Ochotsk (Brandt); but again it is not known from the north-west coast of America. On the north-eastern side of America it has been taken at Labrador, Newfoundland, Gulf of St. Lawrence, Nova Scotia and in the Gulf of Maine south to Cape Cod (Smith, M. Rathbun), and the greatest known depth here is 137 fm., while at Spitzbergen it has been taken once in nearly 170 fm.

The species is not known from East Greenland or Jan Mayen; nor according to the above account is it known from the 100 degrees of longitude along the north coast of Asia nor from the northern or western coasts of America. Much is wanting therefore to prove it circumpolar; it may be so but there is just as much probability at least for its not being so. The fact, that it has not been taken north of  $69\frac{1}{4}^{\circ} N. L.$  at West Greenland, is not known from arctic America north or north-west of Labrador, nor from East Greenland, is rare in the Kara Sea, while on the other side it goes down to the Channel, shows that the species is not typically arctic but that in its occurrence it has just as much the appearance of being boreal as arctic.

Of its bathymetric distribution may be said, that it occurs as a rule in depths of 15 to 70 fm.,

<sup>1</sup> In 1907 A. Birula casts doubt on Stuxberg's determination of the specimens from these localities.

but that it is sometimes met with in quite shallow water, while nearly 170 fm. is the greatest depth I have found ascribed to it.

Remarks. The largest specimens I have seen were taken in Breidals Vig on the east coast of Iceland in 9—14 fm. (A. C. Johansen). The largest of these is a male which has the following dimensions: length of cephalothorax 110 mm., breadth of this 86 mm., length of the first pair of legs 152 mm., distance between the tips of the second pair of legs 392 mm.

## 6. *Hyas coarctatus* Leach.

1815. *Hyas coarctatus* Leach, Transact. Linn. Soc. Lond., Vol. XI, p. 329.

? — — Cuvier, Le Règne animal, Edit. acc. de Planches grav., Pl. 32, fig. 3.

! 1851. — — Brandt, Krieb, in Middendorffs Sibir. Rejse, B. II, 1, p. 81.

1893. — — M. Rathbun, Proc. U. S. Nat. Mus., Vol. XVI, p. 69.

Occurrence. This species has been taken by the "Ingolf" at the following stations.

Davis Straits: St. 31: 66° 35' N. L., 55° 54' W. L., 88 fm., temp. 1·6°; 9 spec.

— - 34: 65° 17' — 54° 17' — 55 — — ? ; 3 —

— - 26: 63° 57' — 52° 41' — 34 — — 0·6°; 1 —

— Mouth of Ameralik Fjord by Godthaab, 5—70 fm., 1 —

West of Iceland: St. 98: 65° 38' N. L., 26° 27' W. L., 138 fm., temp. 5·9°; 1 spec.

North-West of Iceland: St. 129: 66° 35' N. L., 23° 47' W. L., 117 fm., temp. 6·5°; 3 spec.

North of Iceland: St. 127: 66° 33' N. L., 20° 5' W. L., 44 fm., temp. 5·6°; 7 spec.

West of Iceland in Brede Fjord: St. 87; 65° 2' N. L., 23° 56' W. L., 110 fm., temp. ?; 36 spec.

— - 86: 65° 4' — 23° 48' — 76 — — ?; 9 —

South South-East of Iceland: St. 6: 63° 43' N. L., 14° 34' W. L., 90 fm., temp. 7; 4 spec.

In Malac. Groenl. I have mentioned a number of localities for this species between 70° 25' N. L. and 60° 43' N. L. along the west coast of Greenland, depths from 5 to 100 fm.; later discoveries have not extended our knowledge. It has also been taken, on all four coasts of Iceland at numerous localities; it is common at the Færoes and it has twice been taken in 150 fm. It has not been found at East Greenland or Jan Mayen.

Distribution. From the Færoes it extends southwards over the Shetlands and the Hebrides to the east and west coasts of Scotland and England (Norman, etc.); it has been taken on the south coast of England (Bell), in the Irish Sea (Walker), S. W. of Ireland in 250 fm. (Pocock), at the Channel Islands in 10—20 meters (Koehler) and at Roscoff on the north coast of France (Delage); also at Belgium (v. Beneden), eastern part of the North Sea and Skager Rak (Metzger), Kattegat and northern part of the Sound (Meinert), from the last-named northwards along the whole of the west coast of Scandinavia and at East Finmark (M. Sars), Magdalene Bay on the west side of Spitzbergen (G. O. Sars) and along the north coast of Europe in the Murman Sea to 49° E. L. (Birula), but not in the White Sea (Birula); further east, it is not known with certainty and neither on the west or east coast of Nova Zembla nor in the Kara Sea. (I think that Stuxberg's statement in 1886 of its occurrence in the Kara Sea is incorrect, undoubtedly due to the example of Hoek (see synonymy list to *H. araneus*), as Stuxberg in

his first work of 1882 had also stated that it was *H. araneus* which occurred in the Kara Sea and he does not mention *H. coarctatus* at that place). It is also very common in Bering Straits to  $71^{\circ} 02' \text{ N. L.}$  (M. Rathbun); on the east coast of Asia it has been taken at East Cape and Plover Bay (M. Rathbun), on the Corean coast at  $37^{\circ} 2' \text{ N. L.}$ ,  $129^{\circ} 31' \text{ E. L.}$  (Suenson, in Copenhagen Museum), and a small specimen in the Copenhagen Museum is stated by the collector (Capt. Suenson) to have been taken 15 miles off Amoy, but this locality which lies at  $24\frac{1}{2}^{\circ} \text{ N. L.}$  seems to me for this reason uncertain and perhaps comes from some error. Lastly, on the east coast of America, it has been taken at Labrador, Newfoundland, Gulf of St. Lawrence, Nova Scotia, along the coast of the United States to New Jersey at ca.  $40^{\circ} \text{ N. L.}$ ; and somewhat out from the coast even to  $36^{\circ} 41' \text{ N. L.}$ ,  $74^{\circ} 39' \text{ W. L.}$  (M. Rathbun and S. I. Smith).

The literature contains a very large number of single notices as to the depths at which this species has been taken, and the great majority of these give between 10 and 100 fm., seldom 5 to 10 fm. and sometimes 100—200 fm. I have found only three statements of greater depths, namely, S. W. of Ireland in 250 fm. (Pocock),  $36^{\circ} 41' \text{ N. L.}$ ,  $74^{\circ} 39' \text{ W. L.}$  in 373 fm. (Smith, 1884) and  $41^{\circ} 13' \text{ N. L.}$ ,  $66^{\circ} 1' \text{ W. L.}$  in 906 fm. (Smith, 1884). All these and especially the last are extremely surprising, as the species thus appears to be a true deep-sea form in the Atlantic, but it should be remarked that there is also a further remarkable anomaly, namely, that a little further south at four stations from  $41^{\circ} 10' \text{ N. L.}$  to  $40^{\circ} 20' \text{ N.}$  off the east coast of America it has been taken in depths of only 41 to 62 fm. S. I. Smith is so trustworthy an observer that we cannot doubt his determinations, but so long as there is only this one notice one is inclined until further information is forthcoming to fear greatly that it has arisen through some error or another.

According to this distribution, *Hyas coarctatus* is essentially a boreal form, which extends to a certain extent into arctic waters but is absent at such purely arctic localities as East Greenland (north of  $66^{\circ} \text{ N. B.}$  at least), Jan Mayen, East Spitzbergen and the Kara Sea. It is thus more typically boreal than *H. araneus*, which is also in agreement with the fact that on the east coast of North America it goes much further south than the latter and considerably to the south of Cape Cod; sometimes it goes down into greater depths than *H. araneus*. It is very probably not circumpolar; that its circumpolarity is far from being proved needs scarcely be stated. That the "Fauna Arctica" here as so often is defective and misleading may likewise just be mentioned.

Remarks. *H. coarctatus* is much smaller than the previous species. The largest specimen is a male from West Greenland, locality unknown; the carapace is 99 mm. long, 74 mm. broad, the first pair of legs 156 mm. from the lateral margin of the carapace to the tip (on the underside 171 mm. to the sternum), the second leg 174 mm. from the lateral margin of the carapace to the tip.

## 7. *Portunus holsatus* Fabr.

1798. *Portunus holsatus* J. C. Fabricius, Suppl. Entom. Syst., p. 366.  
 1844. — — Bell, Brit. Crustacea, p. 109, with fig.  
 1861. — — A. Milne-Edwards, Archives du Museum, T. X, 1, p. 393.  
 1863. — — Heller, Crust. südl. Europa, p. 85.

Occurrence. The "Ingolf" has not taken this species, but it is to hand from other sources.

West coast of Iceland: Reykjavik, 1 specimen (taken by Hallgrímsson), and it has been secured a number of times at the Vestmanna Islands and from there eastwards along the south coast of Iceland to ca.  $15\frac{1}{2}^{\circ}$  W. L. in depths from 10 to ca. 60 fm. (A. C. Johansen, "Thor" 1903 and 1904, and "Beskytteren"). At the Færoes it has hitherto been taken only three times, namely, in Kalbaks Fjord, 16—40 fm. (Th. Mortensen); 4 miles east from Naalso, 80 fm. (Th. Mortensen), and  $61^{\circ} 56' \text{ N. L.}$ ,  $7^{\circ} 04' \text{ W. L.}$ , 30 fm. ("Thor" 1903).

Distribution. This species is known from the Shetlands and the Hebrides (Norman), further south from the east and west coasts of England and east coasts of Ireland (various authors), north and west coasts of France (Bonnier). It is said also to have been taken in the Mediterranean (Costa, test. Heller) and in the Black Sea (Czerniavsky, test. Ortmann). To this it may be added, that Heller wrote concerning *P. marmoreus* Leach: "ist vielleicht bloss eine Varietät" of *P. holsatus*; A. Milne-Edwards & E. L. Bouvier wrote in 1899: "Si, comme il y a lieu de le croire, le *P. marmoreus* doit être identifié avec le *P. holsatus* Fabricius", and they show that *P. marmoreus* is taken at the Azores and state that it "habite depuis le voisinage du littoral jusqu'à 60 m.—100 m. profondeur". I am unable to settle the question whether *P. marmoreus* Leach is only a variety of *P. holsatus* Fabr., but mention the statements cited so as to show so far as possible the present state of our knowledge, with special regard to the distribution of this species to the south.

*P. holsatus* has also been taken at the coasts of Belgium (v. Beneden), Holland (Herklots, test. Ortmann), off and at the west coast of Jutland (Meinert, Metzger), in the Skagerak and "northern part of the Kattegat as far as Varberg" (Meinert), at the south coast of Norway (G. O. Sars), lastly Vesteraalen in Lofoten (Nordgaard). The greatest depth I have found given is 70 fm., stated by Meinert (1890).

The most northerly place from which the species was formerly taken was the Shetland Isles, between  $60$  and  $61^{\circ} \text{ N. L.}$ ; the statements given above of its occurrence not only at the Færoes but also at the southern coast and the south part of the western coast of Iceland to ca.  $64^{\circ} 10' \text{ N. L.}$  mean a not unimportant increase to its distribution, and we have at the same time a new example of how southern forms reach up to these places at Iceland.

Remarks. The largest of the above-mentioned specimens came from the south coast of Iceland; its carapace is 34 mm. long and  $44\frac{1}{2}$  mm. broad, which shows that it is indeed adult but not a specially large specimen, as A. Milne-Edwards (1861) gives respectively 40 and 53 mm. as the two dimensions of the carapace.

### 8. *Carcinus Mænas* L.

1758. *Cancer Mænas* Linné, Syst. Naturæ, Ed. X, p. 627.

1844. *Carcinus* — Bell, Brit. Crust., p. 76, with fig.

! 1861. — — A. Milne-Edwards, Archives du Museum, T. X, p. 391.

1866. — — Heller, Crust. südl. Europa, p. 91, Taf. II, Fig. 14, 15.

Occurrence. This species, which was not taken by the "Ingolf", is present from the following localities.

West coast of Iceland: Reykjavik, the shore at ebb-tide; 4 spec. (A. C. Johansen).

— — — 2 miles S. E. of Reykjavik, 6 fm., sand and stone; 2 very large spec.  
(A. C. Johansen).

South of Iceland: Vestmanna Islands, in sandeel-net; 1 spec. (A. C. Johansen).

Færoes: two old specimens identified by Kroyer (taken by Nees).

— Aadna Fjord, 0—15 fm., (R. Hørring).

— Head of Trangisvaag Fjord, 0—1 fm.; 1 good-sized spec. (Otterstrom).

Distribution. The species is known from the Shetlands and Norman writes that it is "remarkably large" there. A. Milne-Edwards writes in his Monograph (l. c., p. 392): "Cette espèce vit en grand nombre sur les côtes de France et d'Angleterre. On la rencontre sur tout le littoral de la Méditerranée, peut-être même jusque dans la mer Rouge. Les Carcins Ménades se trouvent sur les côtes des Etats-Unis d'Amerique. Au nord, ils remontent jusqu'à la mer Glaciale". The last two statements however require correction, but I have thought it right to cite what stands in the Monograph. According to Gourret's "Tableaux comparatifs" (p. 44) the species is also found in the Black Sea, at the coast of Portugal and at the Canary Isles, but I do not know the sources from which he takes these data, of which especially the last is of interest. On the east coast of North America the species according to Smith and M. Rathbun is distributed from ca.  $43\frac{2}{3}^{\circ}$  N. L. to  $39\frac{1}{2}^{\circ}$  N. L. It occurs on all coasts of the North Sea, goes through the Sound and the Belts into the western Baltic (Meinert, Mobius); on the west coast of Norway it goes to the North Cape (M. Sars, Appellöf), but statements on its occurrence at East Finnmark and in the Murman Sea seem to be erroneous (Appellöf).

Kingsley (1878) writes: "This species is almost cosmopolitan in its range. It is found on the Eastern Coast of the U. S., from Cape Cod to New Jersey (in 1879 he gives a still more southerly locality, namely, Northampton Co. in Virginia), at Panama, in the Hawaiian Islands, France and England, in the Baltic and Mediterranean, the Red Sea, Brazil, and, doubtfully, in Australia". In his work on the Indian Crustacea Alcock states that he has seen a specimen from Ceylon; in 1902 it is noted from Port Phillip, Victoria (teste Calman).

This distribution of a coastal form such as *Carcinus Menas* is extremely interesting; we know indeed some few species of crabs and Stomatopoda which have just as great a distribution in the tropical belts, but none that go so far north.

Remarks. In the largest of the above-mentioned specimens from Iceland the carapace is 79 mm. broad and 62 mm. long; the distance between the tips of the second pair of legs is 234 mm.

### 9. *Geryon affinis* A. M.-Edw. & Bouv.

Pl. I, figs. 1 a—1 b.

1894. *Geryon affinis* A. Milne-Edwards & E. L. Bouvier, Rés. des Camp. sc. de l'Hirondelle, fasc. VII,  
p. 41, Pl. I, fig. 1.

1904. — — F. Doflein, Brachyura, in Wiss. Ergebn. Deutschen Tiefsee-Exp., B. 6, p. 106,  
Taf. III, IV, XXXIII, XXXIV, Taf. XXXVIII, Fig. 1—6, Taf. XLI, Fig. 3—7,  
Taf. XLIII, Fig. 2 & 8.



Occurrence. The "Ingolf" took this species at the following two stations.

S. of Iceland: St. 67: 61° 30' N. L., 22° 30' W. L., 975 fm., temp. 3°; 1 female.

— — — 65: 61° 33' — 19° 0' — 1089 — — 3°; 1 male.

Distribution. This species was first taken by the Prince of Monaco at ten stations near the Azores and in depths from 330 to 733 fm. These islands lie between 37° and a little below 40° N. L.; the occurrence of *G. affinis* at 61½° N. L. and at much greater depths as indicated above has therefore considerable interest. Further, it has been taken in the South Atlantic at ca. 25½° S. L. in a vertical net at 1064 fm. and 498 fm. (Doflein), at the coast of East Africa a little below 3° N. L. in 724 fm. (Doflein) and in the Indian Ocean off the Travancore coast (Alcock).

Remarks. A. Milne-Edwards and Bouvier have given a detailed and careful description of this species and remarked on the differences between it and the nearly allied *G. quinquedens* Smith. The "Ingolf" specimens certainly belong to *G. affinis*, which is evident amongst other things from the form of the last joint of the walking legs, a character specially noted by the French authors with good reason. These authors have only figured an extremely large specimen; my specimens are rather small, the carapace in the male being only 40 mm., in the female 42 mm. in length, and I have thought it useful to give the outline of the carapace of both specimens so as to show the variation in form and number of processes between these two specimens and between these and the specimen figured by M.-Edwards & Bouvier.

The female bears thousands of very small eggs, the diameter of which is 0.5—0.6 mm. The Zoëæ of a number of eggs were just breaking out or had just broken out. This is of interest as it shows that there is here a normal swimming stage in this deep-water form.

#### 10. *Geryon tridens* Kr.

! 1837. *Geryon tridens* Kroyer, Naturh. Tidsskr. B. I, p. 10, Tab. 1.

1881. — — — *longipes* A. Milne-Edwards, Compt. Rend. Acad. Sc. Paris, T. XCIII, p. 879 (teste A. M.-Edw. & Bouvier).

! 1900. — — — A. Milne-Edwards & E. L. Bouvier, Exp. Scient. du Travailleur et du Talisman, Crust. Déc., I, p. 103, Pl. II, Pl. XVII, figs. 13—21.

1903. — — — Senna, Bull. d. Soc. Entom. Ital., Anno XXXIV, 1902, p. 354.

Occurrence. Between the Færoes and Scotland: 59° 28' N. L., 8° 1' W. L., 687—580 fm.; 1 spec. (12/8 1902, "Michael Sars").

Distribution. The species was originally founded on a specimen from the south-eastern part of the Kattagat; later, it has been taken in the Skager Rak near the Skaw (Joh. Petersen). In Norway it is not rare in the inner part of Christiania Fjord and has also been taken in one of the fjords at Bergen (G. O. Sars). It is noted from 48° 31' N. L., 10° 3' W. L., 690 fm. (Norman), near Valentia, Ireland, in dredging from "85 to 808 fathoms", lastly from 59° 37' N. L., 7° 19' W. L., 530 fm., temp. 8°. As *G. longipes* has been included as a synonym, the distribution of the species is extended to the following regions: Gulf of Gascogne, at a number of localities with depths from 346 to 617 fm. (Caullery, A. Milne-Edwards & Bouvier), the western Mediterranean near the south coast of France, at Sardinia,

Naples, between Stromboli and Messina, the Adriatic, from 266—372 fm. to 800 fm. (several authors). — We may summarise the data on its bathymetric distribution by saying, that it occurs in depths between 250 and 800 fm.; in the Danish waters isolated specimens are met with at intervals of many years in much smaller depths, certainly even as low as between 20 and 30 fm.

Remarks. The specimen taken by the "Michael Sars" is a small female, with carapace 25 mm. long. Comparing this with a female (and a male) of the same size of *G. longipes* A. M.-Edw. from the Gulf of Gascogne, I have come to the conclusion that there is absolutely no difference between the specimens; then I compared all three with a specimen of *G. tridens* Kr. from Norway: a male with carapace 53 mm. long, and found that the differences noted by Milne-Edwards & Bouvier between *G. tridens* and *G. longipes* do not hold good. Senna came to a somewhat similar result, but the differences in the mouth-parts mentioned by him are also not maintainable and quite worthless as specific characters. I consider it quite certain that *G. longipes* A. M.-Edw. is only a synonym of the old species of Kroyer.

## II. *Cyonomus Normani* Lankester.

Pl. I, figs. 2 a—2 i.

1904. *Cyonomus Normani* E. Ray Lankester, Quart. Journ. Micr. Sc. Vol. 47, New. Ser. p. 456, Pl. 33, fig. 1, Pl. 34, figs. 8, 10, 11.

Occurrence. There is only one specimen from the "Ingolf" expedition, but later the "Thor" has twice taken this remarkable form.

South-West of Iceland: St. 73: 62° 58' N. L., 23° 28' W. L., 486 fm., temp. 5.5°; 1 spec.

South of Iceland: 62° 57' N. L., 19° 58' W. L., 509 fm., "Thor" 14. VII. 1903; 1 spec.

South-West of the Færoes: 61° 15' N. L., 9° 35' W. L., 516 fm., "Thor" 22. V. 1904; 1 spec.

Distribution. The species was only known previously from two places south-west of the last-named locality, namely, in the warm area south of the "Wyville Thomson Ridge" at ca. 59½° N. L. in 542 and 705 fm.

Remarks. The species has been described and richly illustrated in the paper mentioned of Lankester. Before this was prepared I had drawn some figures of the single and very defective specimen of the "Ingolf"; a copy, in outline, of one of these figures is introduced in Lankester's paper (fig. 12 on p. 459) with some remarks. I have thought it of no use to give a detailed description of the species, as the differences between it and the *C. granulatus* Norm. fully described by A. Milne-Edwards & E. L. Bouvier have been indicated by Lankester. I have however drawn the anterior margin of the carapace and the eye-stalks of all my three specimens in order to show, that there is some variation between them in the reduction of the rostrum, in the form of the eye-stalks and in the size of the lateral corner-processes. In all my specimens the eye-stalks diverge a little from one another at the anterior margin of the head — they are not, as Lankester states, "immutably united to the margin of the carapace", as the anterior margin of the carapace is quite free above the skeleton of the head; figs. 10 and 11 on Pl. 34 of Lankester's paper likewise show that there is some distance between the roots of the two eye-stalks, and fig. 8 (Pl. 34) must undoubtedly be incorrect in

this regard. My figures show the slight variation in the curvature, thickness etc. of the eye-stalks, which are all of course without any trace of a cornea; they further show the granular structure correctly, as I have given the granulae according to the right number and relative size. The differences in these regards between Lankester's figures and mine I ascribe unhesitatingly to imperfections in the former, as there is not the least doubt that Lankester's specimens of *C. Normani* and mine belong to the same species. On the other hand, Doflein is quite wrong in considering *C. Normani* a sub-species of *C. granulatus*.

## B. Anomura.

### 12. *Neolithodes Grimaldii* A. M.-Edw. & Bouv.

1894. *Lithodes Grimaldii* A. Milne-Edwards & E. L. Bouvier, Rés. Campagnes sc. l'Hirondelle, fasc. VII, p. 62, Pl. III, figs. 1-6.

1894. — Goodei Benedict, Proc. U. S. Nat. Museum, Vol. XVII, p. 479.

1896. *Neolithodes Grimaldii* Bouvier, Ann. Sc. Nat., Zool., Sér. 8, T. I, p. 22 (with complete synonymy).

Occurrence. The "Ingolf" has taken this species at 3 stations.

Davis Straits: St. 25: 63° 30' N. L., 54° 25' W. L., 582 fm., temp. 3.3°; 1 gigantic specimen.

South of West Iceland: St. 68: 62° 06' N. L., 22° 30' W. L., 843 fm., temp. 3.4°; 1 very small spec.

— — — — 40: 62° 00' — 21° 36' — 845 — — 3.3°; 1 — — —

Distribution. The type specimens of the French authors were taken near Newfoundland in 674 fm. The species has several times been found off the east coast of America, but being confused by Smith with *L. Agassizii* I am unable to see everywhere which species he had from any given locality, and will therefore restrict myself to saying, that it was taken at any rate at 39½° N. L., 41½° N. L. and at intermediate places off the east coast mentioned in depths from 410 to 1230 fm.

Remarks. In the largest specimen from St. 25 the carapace, excluding the spine- or process-like rostrum, is 104 mm. long and 91 mm. broad; the fourth thoracic leg 308 mm. from the base of the coxa to the tip. The spines on the thorax must have been for the most part extremely long, but the long ones are all broken; the longest fragment is however 26 mm.; the number and position of the spines agree with the figures in the literature by S. I. Smith and A. Milne-Edwards & E. L. Bouvier, but it should be remarked that there are several short, conical tubercles or small processes more or less close to the margin of the carapace and on the upper surface some low tubercles which must be regarded as rudimentary spines. — In the two small specimens the carapace is respectively ca. 7 and 8 mm., apart from the long process of the rostrum; they are typically developed specimens of *N. Grimaldii*, but it should be remarked that in the larger specimen, the carapace has some fairly short to quite short spines chiefly on its posterior half between the long spines and at the margin (almost as Smith's fig. 2 in Rep. U. S. Comm. Fish and Fisheries for 1885, Pl. III), while in the smaller specimen only the posterior margin and a small part of the lateral margin of the carapace — but not the upper surface — have some short spines between the long.

13. *Lithodes Maja* L.

1758. Cancer *Maja* Linné, *Systema Naturæ*, Ed. X, I, p. 629.

! 1853. *Lithodes Maja* Bell, *Brit. Stalk-eyed Crust.* p. 165, with fig.

! 1894. — *arctica* E. L. Bouvier, *Ann. Sc. Nat., Zool., Sér. 7, T. XVIII*, p. 181, Pl. X, fig. 7, Pl. XII, figs. 5a–5b.

1896. — *Maja* E. L. Bouvier, *Ann. Sc. Nat., Zool., Sér. 8, T. I*, p. 24.

Occurrence. The "Ingolf" has not brought home this species, but it is to hand from several other sources.

Davis Straits: 65° 30' N. L., 55° 26' W. L., 289 fm., sand and stones, Wandel 1889; 1 spec.

Denmark Straits: off Angmagalik, at ca. 65° N. L., 140 fm., stones, 2<sup>nd</sup> Amdrup Exp. 1900; 1 spec.

South of Iceland: Vestmanna Islands, District-physician Thorstein Jönsson; 1 large spec.

Færoes: Agent Müller; 1 spec.

Distribution. The species extends from the Shetlands (Norman) and the Orkneys (Bell) southwards, on the west side of Great Britain to the Isle of Man (Bell), in the North Sea to the coasts of Belgium (v. Beneden) and Holland (Hoek). At Denmark it is only found in the more northerly half of the Sound and has been noted by the fishermen from Anholt (Meinert); it is also known from Bohuslän (Goës), along the Norwegian coast to Vadsø at Varanger Fjord (M. Sars), lastly on the most western part of the south coast of the Murman Sea, but not in the White Sea (Birula). A single specimen is recorded from 74° 25' N. L., 17° 36' E. L., nearly 100 fm. (Hartlaub, teste Birula); another from West Spitzbergen (Doflein). On the east coast of America it has been taken at Nova Scotia, in the Gulf of Maine and southward to 40° 3' N. L. (S. I. Smith); the depths are given as "52 to 90" and down to 291 fm. — The species is thus boreal and not arctic (as Doflein states); it has not been taken at any place with temperature below zero.

14. *Paralomis spectabilis* n. sp.

Pl. I, figs 3 a–3 d; Pl. II, figs. 1 a–1 b.

Occurrence. The "Ingolf" has taken this large new species at four stations.

Between South Greenland and Iceland: St. 92: 64° 44' N. L., 32° 52' W. L., 976 fm., temp. 1.4°; 2 small spec.

— — — — — 95: 65° 14' — 30° 39' — 752 — — 2.1°; 1 good-sized ♂.

— — — — — 96: 65° 24' — 29° 00' — 735 — — 1.2°; 2 — — ♂ and ♀.

South of Iceland: St. 64: 62° 06' N. L., 19° 00' W. L., 1041 fm., temp. 3.1°; 1 small ♂.

Description. In appearance this species shows considerable resemblance to *Neolithodes Agassizii* Smith as figured in *Bull. Mus. Comp. Zool. Vol. X, Pl. I*, but it is easily distinguished by the development of the antennal squama and the abdomen. Within the genus *Paralomis* the new species belongs to the division which lacks the protuberance on the under side of the rostrum (see Bouvier's classification).

The carapace, excluding the rostrum, is almost as long as broad; its posterior margin is considerably incised in the centre, and an obvious curve is seen on each lateral margin at a distance from the anterior corner of a little less than one-third of its length; the carapace is further provided with ca. 30 long to fairly long spines (including the marginal spines), some smaller spines and numerous

small tubercles. The rostrum is short and has the usual three smooth processes, the form and direction of which offer nothing of interest. The gastric area is greatly arched, marked posteriorly by a deep cervical furrow from the cardiac area; on the gastric area are 7 very apparent spines, namely, one unpaired long and strong spine in front of the central portion and 3 pairs somewhat shorter but yet good-sized spines out towards the lateral margins, and also some small spines and a number of very small tubercles. Each hepatic region has two long marginal spines, the first of which is on the anterior corner, as also some small tubercles; the considerably arched cardiac area has 4 good-sized spines. The lateral margin has 4 to 5 good-sized and several smaller spines behind the cervical furrow; along the posterior margin are 4 to 6 somewhat low and also some minute spines.

The eye-stalks touch one another at the base; they bear some small tubercles or spines on the upper side. The stalk of the antennæ reaches almost to the middle of the last joint of the peduncle of the antennula; its first joint (fig. 3 b) has a short spine on its outer anterior corner; the spine on the front corner of the second joint reaches forward in front of the middle of the squama and at its base the outer margin sometimes has a tubercle. The squama (figs. 3 b, 3 c, 3 d) has as a rule two processes on the proximal  $\frac{2}{5}$ -ths of its outer margin, the distal one being as a rule fairly long, much longer than the proximal which is short usually but may also at times be longer than the distal or lacking altogether; above on the inner margin, the squama has as a rule a tubercle or short spine near its base and in one of the specimens further a rather long distal spine on the left squama. The flagellum is as long as or even a little longer than the distance from the tip of the longest process of the rostrum to the posterior margin of the cephalothorax. Between the last pair of maxillipeds the sternum has two tufts of bristles but no spines.

The first leg on the right is a little longer and considerably thicker than that on the left, the chela especially is much heavier; the meropodite has a single, very long spine on the inner side at the anterior end; the carpus has a similar very long spine on the inner side and on the upper side out towards the lateral margin several fairly long and some shorter spines. The three pairs of walking legs are long with the larger spines placed in rows; the front upper margin of the carpus has 3 long and 3 short or very short spines.

The second segment of the abdomen (figs. 1 a and 1 b) has only short or even fairly short, setigerous spines and several small spines or protuberances. No row of protuberances between the median plates of the 3<sup>rd</sup>—6<sup>th</sup> segments. In the large male (fig. 1 a) the right lateral plate of the 3<sup>rd</sup> segment has a single, lateral, movable plate, the left none at all; in the small male the right lateral plate of the same segment has two movable lateral plates, the left lateral plate one; in the females (fig. 1 b), there is no movable lateral plate on the right lateral plate of either the third or fourth segment.

Measurements. The largest specimen, a female with 1<sup>st</sup> pair of legs broken off, has the following dimensions.

Length of cephalothorax to tip of longest process of rostrum....	54.5 mm.
— — — — — base of rostrum.....	45.5 —
Breadth — — — — — .....	46 —
Length of second right walking leg, on under side.....	119 —
— — — — — — — — — upper — .....	114 —

In a second female the cephalothorax with rostrum is 48.8 mm., the 1<sup>st</sup> right leg below 69 mm., the 2<sup>nd</sup> right leg below 106 mm.

#### 15. *Paralomis Bouvieri* n. sp.

Pl. II, figs. 2 a—2 f.

**Occurrence.** The "Ingolf" has taken this interesting form at 2 localities.

Between South Greenland and Iceland: St. 96: 65° 24' N. L., 29° 00' W. L., 735 fm., temp. 1.2°; 1 spec. (♂).

South of Iceland: St. 53: 63° 15' N. L., 15° 07' W. L., 795 fm., temp. 3.1°; 1 spec. (♀).

**Description.** One of the two specimens is a good-sized female with eggs, the other a somewhat small male. To judge from the general body-form, spine-equipment of cephalothorax, form and armature of rostrum, length and spination of the legs etc. it is quite certain that the two specimens belong to the same species, but they differ greatly nevertheless in the spination of the antennal squama, in the spiny equipment of the abdomen and above all in that the marginal plates on the 3<sup>rd</sup> abdominal segment are quite free in the male, but quite fused with the lateral plates in the female. As this feature in the marginal plates of the third segment is generally considered an important generic character, the male should be referred to *Acantholithus* Stimps., the female to *Paralomis*; I have preferred to place the species with the latter as it shows some resemblance to *P. aculeatus* Hend.

The carapace, excluding the rostrum, is but little longer than broad; the posterior margin in the female is obviously incised in the centre, in the male only slightly, and on each lateral margin there is a conspicuous curve at a distance of a little more than one-third of its length from the fore corner. The upper surface in the female is densely covered with spines, many of which are long, some moderate and some fairly short, but most of them are slender and end with a little tuft of bristles; in the male the spines are even slightly more numerous and the longest relatively longer than in the female, while the short are relatively shorter and less slender than in the latter. The rostrum (fig. 2b) is short and ends with the ordinary three processes which have a small number of extremely small tubercles; there is no projection or spine on the under side, but on the upper side close behind the distal processes the rostrum has two fairly long, slender spines. The gastric area is somewhat highly arched; the cervical furrow is deep and very sharply marked between the gastric and the cardiac areas, but opposite the anterior corners of the latter it has really disappeared.

The eye-stalks (fig. 2b) are apposed at the base; each has a pair of spines and some granulations on the upper surface, as also a fairly long, slender spine from the distal end over the black eye. The stalk of the antennæ is almost as in the previous species, but the spiny equipment of the outer margin is more developed; the outer, anterior corner of the first joint bears a spine in the female but none in the male; in both specimens a moderate spine springs from the base of the terminal long process, and behind this there is in the female another very short spine. As mentioned the squama is very different in the two specimens; in the female (fig. 2c) it may be said to be short, fairly thick, ending with two spines, the outer of which is long and the inner very long; behind the inner above there is a fairly long spine and behind this again on the left squama a pointed tubercle. In the male the squama may be described as thorn-like, on the inner side of the right squama (fig. 2d) there is a moderately

short spine and on the outer side a short spine near the base; the left squama (fig. 2e) has no spine on the outer side, but two short ones on the inner side, one near the base, the other about opposite the centre. The sternum has two groups of bristles between the posterior pair of maxillipeds but no spines.

The first pair of legs in the female are almost equally long, but the carpus and hand are considerably thicker on the right leg than on the left (the right leg is wanting in the male); the spiny equipment is well-developed, a distal spine on the inner side of the meropodite and a spine on the centre of the inner side of the carpus being especially very long; the others are easily seen from the figure. The walking legs are relatively a little shorter than in the previous species; the spine-equipment is well-developed, but while some of the spines, especially the long, are in rows, others are scattered.

The second segment of the abdomen is provided with numerous spines in both sexes, but while in the female these are almost as long as on the posterior part of the carapace, they are obviously shorter in the male; the rest of the abdomen is, as already mentioned, so different in the two specimens that these must be described separately. In the male (fig. 2f) the upper surface of the 3<sup>rd</sup> to the 7<sup>th</sup> segment is provided with many setigerous tubercles, some of which are almost like short spines; on each side of the 3<sup>rd</sup> to the 5<sup>th</sup> segments are fastened movable, marginal plates 10 in all, some of them very small but each drawn out into a spine and sometimes also provided with a tubercle; the lateral plate of the 3<sup>rd</sup> segment has on each side three of these movable, marginal plates, and there is a fourth plate between the 3<sup>rd</sup> and 4<sup>th</sup> segments. There does not seem to be any spinous tubercles between the middle plates of the segments. In the female (fig. 2g) the upper surface of the 3<sup>rd</sup> to the 7<sup>th</sup> segments is covered by numerous, moderately long spines; the marginal plates of the 3<sup>rd</sup> segment are completely fused with the lateral plate, so that the line of junction cannot be seen; on the 4<sup>th</sup> segment the second marginal plate is completely fused with the lateral plate, while the two others are very movable and large; the marginal plates of the 5<sup>th</sup> segment are all very movable. Between the central plates of the 3<sup>rd</sup>—4<sup>th</sup> and 4<sup>th</sup>—5<sup>th</sup> segments in the female there is a cross-row of tubercles with spines but only a single tubercle of this kind between the central plates of the 5<sup>th</sup> and 6<sup>th</sup> segments.

Measurements. — Female. The length of the carapace to the tip of the longest process of the rostrum is 43.5 mm., without the rostrum 34.8 mm.; breadth of carapace 34 mm., first right leg (chela) on the upper side 61.5 mm., on the under side 66.5 mm.; the second right leg on the upper side 80 mm., on the under side 85.5 mm.

Male: Length of carapace to tip of longest process of rostrum 28.7 mm., without rostrum 23 mm.; breadth of carapace 21 mm.; the first and second legs on the right side are wanting, the third measures on the upper side 52 mm., on the under side 57 mm.

Remarks. I have called this species after Professor E. L. Bouvier, who has done such good work in connection with the Decapoda and amongst these not least with the family Lithodidae.

#### 16. *Eupagurus Bernhardus* L.

1758. *Cancer Bernhardus* Linné, Syst. Naturæ, Ed. X, p. 631.

! 1844. *Pagurus* — Bell, Brit. Crust. p. 171, with fig.

- ! 1896. *Eupagurus Bernhardus* Bouvier, Feuille d. Jeunes Natur., III Sér. 26<sup>e</sup> Ann. p. 151, fig. 21.  
 1900. — — A. Milne-Edwards & E. L. Bouvier, Exp. Scient. du Travailleur et du Talisman, Crust. Déc., I, p. 239.  
 ! 1901. — — Benedict, Proc. U. S. Nat. Mus., XIII, p. 452, with fig.  
 — — *acadianus*, — — — — — XIII, p. 454, — —

Occurrence. This species has only once been taken by the "Ingolf".

West side of Iceland: Dyre Fjord, in plaiice-net, 2 large spec.

I have also seen specimens from several points along the west coast of Iceland, right from its northernmost part, namely Hofn Bugt, also Adelvig, Skutils Fjord, Önundar Fjord, Brede Bugt, Faxa Fjord, Reykjavik; it has been taken on the western part of the south coast of Iceland at Grindavik, Vestmanna Islands, off Eyjafjallajökul and at 17° 34' W. L., but not from any more easterly locality, and it has never been taken on the north or east coast of Iceland. At Iceland it has been taken on the beach at ebb-tide and from there out to ca. 60 fm. At the Færoes it is common and goes down to 100 fm.

Distribution. It occurs at the Shetlands (Norman), is common at Scotland, England and Ireland, also on the north coast of France and on its west coast in the Gulf of Gascogne (several authors). It is noted from the coast of Portugal (Capello, test. A. M.-Edw. & Bouvier); in the Mediterranean it has been taken at Marseilles (Gourret) and is noted (by Guérin, test. A. M.-Edw. & Bouvier) from Morea, but this seems to me somewhat doubtful. It is also distributed on the southern and eastern coasts of the North Sea (Metzger, etc.), through the Kattegat and somewhat into the Danish Belts (Meinert); it is known further from Kiel and Eckernförde (Möbius). It occurs on the southern and western coasts of Norway, on the west and east coasts of Finnmark (M. Sars, Norman, Nordgaard) and on the coast of the short, western part to ca. 35° E. L. of the Murman Sea (Birula). On the east coast of North America the species occurs "from the Grand Bank of Newfoundland to the mouth of Chesapeake Bay, 7 to 265 fathoms" (Benedict; he speaks here of his [both from his own descriptions and figures and from my own investigation of an American specimen] quite stillborn *P. acadianus*); this means from ca. 45° to 37° N. L. — On the other hand I believe that Benedict is right in referring the specimens described by Brandt as *P. Bernhardus* var. *granulato-denticulata* from Unalaska and by Owen as *P. streblonyx* from Kamtschatka to some other species than *P. Bernhardus*, in other words *Eup. Bernhardus* does not occur in the Bering Sea or adjacent regions.

In the "Travailleur" and "Talisman" report A. Milne-Edwards & E. Bouvier introduce their account of the distribution of *Eup. Bernhardus* with the following sentence: "*L'E. Bernhardus* est une espèce arctique dont les représentants se répandent dans les régions septentrionales des deux continents...". According to the above this is incorrect; the species is boreal on the coasts of both sides of the Atlantic; it extends somewhat but not far into the regions where arctic forms are as numerous as or a little more numerous than non-arctic species, but not only is it not found in purely arctic waters, it has never been met with at West Greenland nor on the northern or eastern coasts of Iceland.

Remarks. The largest specimen I have seen is from Dyre Fjord on the northern part of the west coast of Iceland; the right chela is 355 mm. long and 20 mm. broad.



17. *Eupagurus pubescens* Kr.

1838. *Pagurus pubescens* Krøyer, Kgl. D. Vid. Selsk. naturv.-mathem. Afhandl. Syvende Deel, p. 314.  
 ! 1838. — — Krøyer, Naturh. Tidsskr. B. II, p. 251.  
 ! 1846(?) — — Krøyer, Gaimard's Voy. in Scand., Crust. Pl. II, figs. 1 a—u.  
 1879. *Eupagurus pubescens* and Krøyeri, S. I. Smith, Trans. Conn. Acad. Vol. V, p. 47 and 48—50.  
 1894. — — *pubescens* A. Milne-Edwards & E. L. Bouvier, Rés. des Camp. sc. de l'Hirondelle, fasc. VII, p. 74.

Occurrence. The "Ingolf" has taken this species at the following stations.

Baffins Bay: St. 33: 67° 57' N. L., 55° 30' W. L., 35 fm., temp. 0.8°; 2 spec.

— Holsteenborg harbour, 20—30 fm.; 1 spec.

Davis Straits: St. 31: 66° 35' N. L., 55° 54' W. L., 88 fm., temp. 1.6°; 2 spec.

— - 35: 65° 16' — 55° 05' — 362 — — 3.6°; 1 —

West of Iceland: St. 97: 65° 28' N. L., 27° 39' W. L., 450 fm., temp. 5.5°; 1 spec.

— - — - 89: 64° 45' — 27° 20' — 310 — — 8.4°; 1 —

— - — - 87: 65° 02' — 23° 56' — 110 — — ?; 3 —

— - — - 9: 64° 18' — 27° 00' — 295 — — 5.8°; 4 —

North-West Iceland: Dyre Fjord; 8 spec.

North of Iceland: St. 129: 66° 35' N. L., 23° 47' W. L., 117 fm., temp. 6.5°; 5 spec.

— - — - 127: 66° 33' — 20° 05' — 44 — — 5.6°; 13 —

South-West of Iceland: St. 81: 61° 44' N. L., 27° 00' W. L., 485 fm., temp. 6.1°; 1 spec.

— - — - 73: 62° 58' — 23° 28' — 486 — — 5.5°; 2 —

In Malac. Groenl. I have mentioned a large number of localities on the west coast of Greenland, from 72° 37' N. L. to 60<sup>2</sup>/<sub>3</sub>° N. L. and in depths from fairly shallow water to 290 fm.; numerous later discoveries have not brought any addition of importance. At East Greenland it is extremely rare; for myself I have only seen a single small specimen from Hekla Harbour in Scoresby Sound (70° 27' N. L., 26° 12' W. L.) and no foreign expedition mentions it. — I have also seen specimens from a large number of localities on the western, northern and eastern coasts of Iceland, depths from 2 fm. and down to 60—90 fm. It is likewise common at the Færoes, both in shallow water near the coast and out in 100 to 150 fm.; to the S. W. of the Færoes it has been taken in 425—460 fm. and down to 500 fm. ("Michael Sars" and "Thor").

Distribution. The species spreads over the Shetlands and Hebrides (Norman) southward along the English coasts at least to Durham (Norman), and in the Irish Sea (Walker); it is also noted from a point S. W. of Ireland, 200 fm. (Pocock), and this is the most southerly locality for the species on the coasts of Europe known to me. It is also found in the northern part of the Kattegat (Meinert), in the Skager Rak, on the whole coast of Norway (M. Sars), on the north coast of Europe to Nova Zembla, in the White Sea and northern part of the Murman Sea (Birula), at Jugor Schar, 12 fm. (Hansen) and Matotschkin Schar in depths from 4—6 fm. to 60—70 fm. (Stuxberg). It has not been taken in the Kara Sea nor along the north coast of Asia. On the other hand it occurs round Spitzbergen (Doflein and Ohlin) and at Bear Island (G. O. Sars and other authors). On the east coast of America it is found at Labrador (Smith), Gulf of St. Lawrence (Smith), Newfoundland (A. M. Edwards

& Bouvier), Nova Scotia and southwards along the United States to  $37^{\circ} 8' N. L.$ ; between ca.  $42^{\circ}$  and  $39^{\circ} N. L.$  it has several times been taken at considerable depths, from 300 to 640 fm. — On the north-west and west coast of Alaska: Point Barrow, Franklin Point and Norton Sound, a form has been taken which was determined by Murdoch as *E. trigonocheirus* Stimps.; the differences this author mentions between this species and "*E. pubescens* and *E. Kröyeri*" are very small, but as I have not seen specimens I am unable to prove that *E. trigonocheirus* should be included, though for myself I feel sure of it. Similarly, I think that *Eup. capillatus* Ben., *Eup. Brandti* Ben. and *Eup. Dalli* Ben. could only be called species on a modern, American idea of species and that they will all prove to belong to *Eup. pubescens*. The three species named and *E. trigonocheirus* were all taken at Alaska, the Aleutians, Unalaska and in the Bering Sea; with this is in agreement that Brandt notes *Eup. pubescens* from Kamtschatka.

The species is boreal-arctic, not pronouncedly arctic, as (1) it seems to be lacking in the Kara Sea, at Franz Joseph's Land and Jan Mayen, (2) it is very rare at East Greenland, from which only a single, small specimen has been brought, (3) it appears so far south as in the Irish Sea and south-west of Ireland, (4) it has several times been taken by the "Ingolf" in depths from 300 to 486 fm. but always in the warm area only, and this applies also to its occurrence in the Færoe Channel and on the east coast of the United States, where it goes down to 640 fm.

Remarks. I have twice endeavoured to separate *E. pubescens* Kr. from *E. Kröyeri* Smith in my large material, but without success, and though it is easy enough to refer some specimens to one or other of the two forms other specimens show so many transitional stages, that I must follow G. O. Sars and A. Milne-Edwards & Bouvier in putting them together. Concerning the 4 "species" found at Alaska and the Aleutians, see above. — The largest specimen I have seen is from Önundar Fjord on the north-west side of Iceland; it was taken in 10–12 fm. and its right chela is 31 mm. long and 16 mm. broad.

### 18. *Eupagurus tricarinatus* Norm.

1869. *Pagurus tricarinatus* Norman, Rep. Brit. Assoc. Adv. Science for 1868, p. 264.  
 ! 1885. *Eupagurus* — G. O. Sars, Den Norske Nordh.-Exped. Zool. Crust. I, p. 11, Pl. II, figs. 8–10.  
 1892. — *variabilis* A. Milne-Edwards & Bouvier, Ann. d. Sc. Nat. Zool., 7 Sér. T. XIII, p. 217.  
 1896. — — E. L. Bouvier, Feuille d. Jennes Natur., III Ser., 26<sup>e</sup> Ann., p. 149, figs. 17 & 18.  
 ! 1900. — — A. Milne-Edwards & Bouvier, Expéd. Scient. du Travailleur et du Talisman, Crust. Déc., I, p. 230, Pl. XXVI, figs. 4–12.

Occurrence.  $61^{\circ} 14' N. L.$ ,  $2^{\circ} 13' E. L.$ , 82 fm., temp.  $6.8^{\circ}$ , "Michael Sars" 1902 (Ad. Jensen); 2 spec.

Distribution. "In deep water" at the Shetland Isles (Norman); the great ridge W. of Norway ( $63^{\circ} 10' N. L.$ ,  $5^{\circ} 25' E. L.$ ) in 98 fm. (G. O. Sars); south-west of Ireland (Calman); it has also been taken at numerous localities in the Atlantic off the coasts of France, Spain, Portugal and northern Africa southwards to  $21^{\circ} 51' N. L.$  and in depths from 62–76 fm. down to 740 fm.; lastly, it is known from the Mediterranean at Sardinia and west end of Sicily (Senna).

Remarks. The two specimens seen by me certainly belong to *Eup. variabilis* A. Milne-Edw. & Bouv. *Eup. tricarinatus* Norm. was taken in deep water near the locality from which my specimens

19. *Anapagurus lævis* Thomps.

- 20.
- Parapagurus pilosimanus*
- Smith.

- It has also been taken in the waters south-west of the Færoes, 61° 7' N. L., 9° 33' W. L., 425—460 fm.



picture of the distribution of the species. It occurs at the Shetlands (Norman), from there southwards along Great Britain and Ireland, on the Channel coasts, west coast of France and the Spanish peninsula, at the Azores, Canary Islands and Cape Verde Islands to 17° N. L.; it has also been taken in the Mediterranean at Marseilles (Gourret), at Syracuse (author) and Algiers (Lucas). It is also found at Holland (Hoek), in the Skager Rak, northern and the whole eastern part of the Kattegat down into the Sound (Meinert); at Norway it goes up to Lofoten (G. O. Sars), thus somewhat north of the Polar Circle.

A. Milne-Edwards & Bouvier write that it is specially common between 8 and 43 fm., but can go much deeper to 120 fm.; concerning its occurrence at Denmark Meinert says: "the depth as a rule is 15–6 fm." .... "once it was taken in so shallow water as 2 fm."

## 22. *Galathea nexa* Embl.

- ? *Galathea nexa* Embleton, Proc. Berwickshire Nat. Field Club<sup>1</sup>.  
 1853. — — Bell, Brit. Stalk-eyed Crust., p. 204, with fig.  
 1859. — dispersa Bell, Journ. Linn. Soc. Lond., Vol. III, p. 3.  
 ! 1888. — nexa Bonnier, Bull. Sc. de la France et de la Belgique, Sér. 3, T. 1, p. 63, Pl. XII, figs. 6–8.  
 ! — — dispersa Bonnier, l. c. p. 68, Pl. XIII, figs. 1–3.  
 1889. — — A. Milne-Edwards & Bouvier, Rés. Sc. de l'Hirondelle (Suppl.) et de la "Princesse Alice", fasc. XIII, p. 72.  
 1900. — — A. Milne-Edwards & Bouvier, Exp. Scient. du Travailleur et du Talisman, Crust. Déc., I, p. 278, Pl. XXIX, figs. 2–3.

Occurrence. It has only once been taken by the "Ingolf".

North-West of the Færoes: St. 1: 62° 30' N. L., 8° 21' W. L., 132 fm., temp. 7°2'; 1 spec.

I have seen some specimens from the southern half of the west coast of Iceland, namely, Faxefjord, Reykjavik and Grindavik, as also from the Vestmanna Islands on the south coast. It has been taken a number of times at the Færoes, sometimes in the bays, sometimes further off the coast, once in 0–4 fm., otherwise from 8–9½ fm. down to 100 fm.

Distribution. Like the previous species it goes (cf. the French authors cited) southward along Great Britain, France, the Spanish peninsula to the Azores and the Canary Islands (A. Milne-Edwards & Bouvier). It has been taken at several places in the Mediterranean: the Ægean Sea, Adriatic, Marseilles, Villafranca and has been found by the author at Syracuse. I have seen specimens from various places in the North Sea; it has also been taken in the Kattegat and northern part of the Sound; on the west coast of Norway it goes up to West Finmark (Nordgaard). In Dijnphna-Togtet I mentioned having seen a specimen from the Kara Sea; my determination was correct, but as the species neither before nor since has been taken in an arctic sea I must suppose that an error from the expedition in the statement of locality occurred in one way or another.

Remarks. It appears from the synonymy list that like *Adensamer*<sup>2</sup> I unite the two species *G. nexa* and *G. dispersa* under one. Bonnier has described a specimen of *G. dispersa* in which the third

<sup>1</sup> I have not been able to complete this reference with data and page.

<sup>2</sup> Long after this text was written I see that Appellöf (Nov. 1906) likewise unites them.



Adensamer, Senna), for the last-named species really refer to the former, though it should be added that we can by no means conclude that the specimens referred by A. Milne-Edwards & Bouvier to *M. bamffica* var. *tenuimana* really belong even to *M. tenuimana* Sars (see below).

*M. bamffica* is known from the Shetlands and from there along the coasts of Great Britain and Ireland (various authors), on the west coast of France and according to A. Milne-Edwards & Bouvier it goes further south to Madeira and past Cape Boyador to 25° 41' N. L. It is widely distributed in the Mediterranean: the Cyclades (Adensamer), and common in the Adriatic and further west. In North Europe, it has been taken at Bohuslän (Goës), also along the whole west coast of Norway, on the east coast at Vadso in Varanger Fjord (G. O. Sars), in the west part of the Murman Sea, finally at 73° 34' N. L., 17° 20' E. L. (Birula).

The species has been found rarely in so shallow water as 13 fm., at England (Bate, teste A. M.-Edw. & Bouv.) and in the Mediterranean; in the Mediterranean it has been taken several times in 30 to 40 fm., but both to the north and south it is most common in depths between 100 and 300 fm.; the greatest depth I can mention with certainty for it is 691 fm. ("Ingolf"), as it cannot be determined whether the depth 750 fm. from the Gulf of Gascogne (Caullery) applies to this or the following species.

Remarks<sup>1</sup>. In 1882 Sars gave three species for Norway. Of these *M. Rondeletii* Bell is certainly identical with *M. bamffica* Penn. (= *M. rugosa* Fabr.; Sars). Sars states of *M. Rondeletii* that he has seen "three specimens all of relatively very considerable size"; I have also seen two very large males from Norway which agree well with Sars' descriptions and figures of this "species", but I think nevertheless that the species is only based on characters which are found in very large males or are untrustworthy for other reasons. The eyes are strikingly small, but I cannot say with Sars that the circle of setæ at the eye is wanting, as my specimens show at places a row of short bristles which seem to have been torn or broken. The lack of a pair of spines on the 4<sup>th</sup> abdominal segment (not 3<sup>rd</sup>, as Sars states) is too unimportant and also, according to A. Milne-Edwards & Bouvier, not maintainable as a character even within *M. bamffica* and the reduced dimension of the eyes seems to me an age-character. My view is also strengthened by the fact that Sars seems to have only 3 very large, but no smaller, specimens of the "species". — *M. tenuimana* G. O. Sars is on the other hand a well-founded species, and on describing it later the chief differences between it and *M. bamffica* will be mentioned. It is therefore incorrect of A. Milne-Edwards & Bouvier — followed by several others — in their various publications to include *M. tenuimana* Sars as a variety connected with the principal form by transitional stages, and it cannot be determined whether they have seen the real *M. tenuimana* or not. The specimen figured by these authors in 1900 (Pl. XXIX, fig. 18) must certainly be a true *M. bamffica*, to judge from the lack of submedian spines on the hind margin of the scutum and the form of this.

All the specimens from the "Ingolf" are small to almost medium-sized; the largest, from St. 54, is a male 53 mm. long, and there is a female 40 mm. long from the same station which had numerous eggs and a number of newly hatched zoëæ attached to the abdominal legs.

<sup>1</sup> Years after I had written the text here I received Dr. Appellöfs work (in Nov. 1906). This author rightly maintains *M. tenuimana* G. O. S. without having observed its best character however; on the other hand he retains *M. rugosa* G. O. S. as distinct from *M. bamffica* (= *M. Rondeletii* Bell). Without being able to follow him in this I may refer to his account; I may add that I have thought it best to make no changes whatsoever in my own account.

24. *Munida tenuimana* G. O. Sars

(Pl. II, fig. 4a; Pl. III, fig. 1a).

1872. *Munida tenuimana*, G. O. Sars, Vid. Selsk. Forh. Christiania, f. 1871, p. 257.

1882. — — — — — f. 1882, no. 18, p. 44, Tab. 1, Fig. 6.

Occurrence. The "Ingolf" has taken this species at a number of localities.

Davis Straits: St. 35: 65° 16' N. L., 55° 05' W. L., 362 fm., temp. 3.6°; 1 spec.

— — — 27: 64° 54' — 55° 10' — 393 — — 3.8°; 4 —

— — — 25: 63° 30' — 54° 25' — 582 — — 3.3°; 1 —

West of Iceland: St. 16: 65° 43' N. L., 26° 58' W. L., 250 fm., temp. 6.1°; 1 spec.

— - - 97: 65° 28' — 27° 39' — 450 — — 5.5°; 32 —

— - - 89: 64° 45' — 27° 20' — 310 — — 8.4°; 11 —

— - - 90: 64° 45' — 29° 06' — 568 — — 4.4°; 13 —

— - - 9: 64° 18' — 27° 00' — 295 — — 5.8°; 34 —

South-West of Iceland: St. 73: 62° 58' N. L., 23° 28' W. L., 486 fm., temp. 5.5°; 11 spec.

— - - 84: 62° 58' — 25° 24' — 633 — — 4.8°; 13 —

— - - 69: 62° 40' — 22° 17' — 589 — — 3.9°; 4 —

— - - 74: 62° 17' — 24° 36' — 695 — — 4.2°; 1 —

— - - 81: 61° 44' — 27° 00' — 485 — — 6.1°; 7 —

— - - 78: 60° 37' — 27° 52' — 799 — — 4.5°; 104 —

South-East of Iceland: — 52: 63° 57' — 13° 32' — 420 — — 7.9°; 1 chela.

I have also seen specimens from 64° 42' N. L., 27° 43' W. L., 426 fm., temp. 6° (Wandel); 62° 12.5' N. L., 20° 06' W. L., 271 fm. ("Thor" 1903); 62° 57' N. L., 19° 58' W. L., 509 fm. ("Thor" 1903); from the two following localities lying south-west of the Færoes ("Michael Sars" 1902): 61° 8' N. L., 9° 33'—9° 46' W. L., 425—460 fm., 1 specimen, and 59° 28' N. L., 8° 1' W. L., 580—687 fm., 5 specimens; lastly, it has been twice taken in 1904 ("Thor") near the first-named of the "Michael Sars" stations.

Distribution. The species was taken by Sars in the deep Norwegian fjords lying between about 60° and 68° 12' N. L., in depths between 300 fm. and 672 fm. In the Skager Rak it has been taken by Joh. Petersen in 210, 265 and 300 fathoms. From these data with those of the "Ingolf" etc. we see that the species is commonest in depths between 300 and 600 fm., the extreme limits being 210 fm. and 800 fm.; the bottom-temperatures were between 3.3° and 8.4°. It certainly goes tolerably far southwards in the deeper water of the Atlantic off southern Europe and perhaps northern Africa, but future investigations must determine more precisely how far it has been confused with *M. banffica*.

Remarks. The largest specimen, a female from the Skager Rak, is 87 mm. long to the tip of the rostrum; the largest "Ingolf" specimen is an egg-bearing female from St. 27; if the rostrum were complete it would measure ca. 74 mm.; the largest of the more than a hundred specimens from St. 78 is a male 64 mm. long. As can be seen, my material is very large and I have found it very easy to separate every single specimen that was at least about 20 mm. long from the previous species with perfect certainty. The best character is given by the sternum of the thorax, which has hitherto been overlooked. In both species the sternum is divided into 4 segments by raised cross-lines furnished





! 1897. *Galacantha rostrata* A. Milne-Edwards & Bouvier, Mem. Mus. Comp. Zool. Vol. XIX, p. 60, Pl. IV, figs. 21—24.

1900. — — A. Milne-Edwards & Bouvier, Exp. Scient. du Travailleur et du Talisman, Crust. Déc., I, p. 308, Pl. VI, fig. 9.

Occurrence. The "Ingolf" has been so fortunate as to take this beautiful species at one station.

West of Iceland (halfway between Iceland and Greenland): St. 11: 64° 34' N. L., 31° 12' W. L., 1300 fm., temp. 16°, 2 specimens.

Distribution. On the American side of the Atlantic this species has been taken at Bequia, Antilles (1591 fm.) and from there northwards to 40° 17' N. L. It was also taken by the "Talisman" off northern Africa at about 30° N. L.; these specimens were described by A. Milne-Edwards as *G. Talismani*, under which name a specimen from Banda (ca. 130° E. L.) was included by Henderson in the "Challenger" Anomura, p. 167, Pl. XX, fig. 1; later, Milne-Edwards & Bouvier included *G. Talismani* as a synonym and also considered the Banda specimen as belonging to *G. rostrata*. Henderson (l. c. p. 167, Pl. XIX, fig. 6) also describes a *G. bellis* and considers it different from *G. rostrata*, but it is taken as a variety by the French authors. Faxon (Mem. Mus. Comp. Zool. Vol. XVIII, p. 78, Pl. B, figs. 1, 1 a) had however in 1895 already both disputed the correctness of considering *G. bellis* as a species and had referred seven specimens taken at three stations west of Columbia or north of the Galapagos Islands to *G. rostrata*. He adds, it is true, that his specimens "differ constantly from the typical West Indian form in the following particulars", but these seem to be small. In 1901, Alcock (Descrip. Catal. p. 274) gives *G. rostrata* as having been taken in the Arabian Sea and Bengal Bay in depths from 1022 to 1520 fm. To sum up, during the last ten years authors have come more and more to the conclusion, that the specimens taken in the different seas belong to *G. rostrata* and that this shows some variation in the length of the spines and in the sculpture. I think that A. Milne-Edwards & Bouvier are quite right when they say (1900), that "*G. rostrata* est une espèce cosmopolite répandue vraisemblablement dans les profondeurs de toutes les mers chaudes ou tempérées". The "Ingolf" has now also shown that the species occurs at ca. 64½° N. L. between Iceland and Greenland; the surface-water here belongs to purely arctic regions, but in deep water at 1300 fm., where the species was taken, the temperature and other conditions of the sea are certainly nearly identical with those found in similar depths between the tropics. *G. rostrata* has only been taken in depths between 1022 fm. (Arabian Sea) and 1591 fm. (Antilles).

Remarks. Both my specimens are males; the larger is 58 mm. long to the tip of the rostrum. When they had just come from the water I noticed that they were reddish yellow in colour with pale red eyes.

## 27. *Munidopsis curvirostra* Whiteaves.

(Pl. III, figs. 2 a—2 e).

1874. *Munidopsis curvirostra* Whiteaves, Ann. Journ. Science 3 Ser. Vol. VIII, p. 212.

1884. — — S. I. Smith, Bull. Mus. Comp. Zool. Vol. X, p. 21 (sine descript.) Pl. VIII, figs. 2, 3, 3 a.

! 1900. — longirostris A. Milne-Edwards & Bouvier, Exp. Scient. du Travailleur et du Talisman, Crust. Déc., I, p. 314, Pl. IV, fig. 1, Pl. XXX, figs. 6—10.

Occurrence. The "Ingolf" has taken this form at six stations.

Davis Straits: St. 35: 65° 16' N. L., 55° 05' W. L., 362 fm., temp. 3°6'; 20 spec.

— — - 28: 65° 14' — 55° 42' — 420 — — 3°5'; 75 —

— — - 27: 64° 54' — 55° 10' — 393 — — 3°8'; 3 —

South-West of Iceland: St. 76: 60° 50' N. L., 26° 50' W. L., 806 fm., temp. 4°1'; 1 spec.

South of Iceland: St. 67: 61° 30' N. L., 22° 30' W. L., 975 fm., temp. 3°0'; 1 spec.

— - — - 63: 62° 40' — 19° 05' — 800 — — 4°0'; 1 —

It has also been taken even further north in Davis Straits than any of the localities just mentioned, namely: 65° 36' N. L., 56° 24' W. L., 349 fm., temp. 3°2', 5 specimens, (Wandel, 1889).

Distribution. The species was first observed in the Gulf of St. Lawrence, 180—220 fm. (Whiteaves); later, at a number of places off the east coast of the United States, between 39° and 40° N. L. in depths from 384 to 1230 fm. and at 33° 35<sup>1</sup>/<sub>3</sub>' N. L., 647 fm. Under the name *M. longirostris* A. M.-Edw. & Bouv. it is noted from the Newfoundland waters, 46° 05' N. L., 49° 02<sup>1</sup>/<sub>2</sub>' W. L., 674 fm., also from off the Sudan at about 30° N. L. in 1104 and 1175 fm. (A. Milne-Edwards & Bouvier). — The occurrence of this deep-water species right up to 65° 36' N. L. in the Davis Straits is one of the many indications that the bottom of the deep part of that sea belongs in zoogeographical regards to the Atlantic. It is not improbable further, that this species will prove to have a much greater distribution than is known at present.

Remarks. The spiny armature on the gastric area is extremely variable: as a rule there are three spines, namely, one on each side of the middle line and one unpaired somewhat further back (fig. 2 a). Sometimes not one but two unpaired spines occur (fig. 2 c), one behind the other; in one specimen the number of spines mounted to nine (fig. 2 d), namely, three in the median line and three on each side all well-developed except the posterior set of paired spines which were small. In contrast to this I have met with an adult specimen in which the spines, four altogether, the most posterior spine excepted were reduced to fairly low, transverse tubercles (fig. 2 e). One of the largest specimens (from Stat. 28) is a male, in which the carapace measures 25<sup>1</sup>/<sub>2</sub> mm. to the tip of the rostrum (the rostrum however is in reality 12 mm. and the carapace itself without the rostrum 15 mm. long), while the greatest breadth is 11<sup>1</sup>/<sub>2</sub> mm.

I have compared a small "Talisman" specimen of *M. longirostris* taken off the Sudan with one of similar size from the "Ingolf" St. 28 and found the most perfect agreement between them; this specimen agrees fairly well also with the description of *M. longirostris* by the French authors, but it should be remarked, that I have not seen either in their co-type or in my smaller "Ingolf" specimens anything similar to the carapace as figured by them, in which the breadth is considerably greater in front than near to the posterior margin and the process from the front outer angle is long and broad.

The species stands fairly near to *M. simplex* A. M.-Edw. as was already noted by the French authors, who indicate a number of differences in the "Travailleur" and "Talisman" reports. I have examined one of their co-types of *M. simplex* from St. Vincent, West Indies and consider it a good species, which in addition to the differences summarised by A. Milne-Edwards & Bouvier is distinguished from *M. curvirostris* by its longer and more slender chela.

28. *Munidopsis Antonii* A. M.-Edw.

Pl. III, figs. 3 a—3 b.

1884. *Galathodes Antonii* A. Milne-Edwards, in Filhol, La Nature Vol. XII, p. 231, fig. 2 (teste A. M.-Edw. & Bouvier).

1888. *Munidopsis Antonii* Henderson, Challenger Anomura, T. XXVII, p. 151, Pl. XVIII, fig. 1.

! 1900. — — A. Milne-Edwards & Bouvier, Exp. Scient. du Travailleur et du Talisman, Crust. Déc., I, p. 321, Pl. IV, fig. 2, Pl. XXX, figs. 21—25.

Occurrence. This species was taken by the "Ingolf" at a single station.

Southern Part of Davis Straits: St. 36, 61° 50' N. L., 56° 21' W. L., 1435 fm., temp. 15°; 1 spec.

Distribution. A. Milne-Edwards & Bouvier note the species from two points north of the Azores at 42° 15' N. L. and 42° 19' N. L. where the depth was 2114 and 2133 fm. In the "Challenger" the species is noted from west of Valparaíso, 1375 fathoms and S. W. of Australia, 1800 fm.

Remarks. My single specimen, a female, has been compared both with the descriptions of A. Milne-Edwards & Bouvier and with a co-type from the Paris Museum. My specimen differs only in that the rostrum is somewhat longer, the spine on the outer corner of the second antennal segment longer and more pointed, reaching out a little past the centre of the outer margin of the following joint, and lastly in that it has four pairs of spines on the gastric area. In all other respects, viz. antennules, eyes, granulation on the thorax, spines and granulation on the legs, it agrees with the description and the Paris specimen. Concerning the rostrum it may be remarked that, according to the measurements of the French authors, this was 14.5 mm. long in a female in which the cephalothorax with rostrum was 45 mm., that is, scarcely a third of the latter length; in my specimen the cephalothorax with rostrum is 26 mm., the much upward curved rostrum 8.8 mm., thus a little over a third of the whole length. For the rest, my figures of the cephalothorax will show the details in the spiny armature.

29. *Munidopsis similis* Smith.

Pl. III, figs. 4 a—4 b.

1885. *Munidopsis similis* S. I. Smith, Proc. U. S. Nat. Mus., VII, p. 496.

! 1887. — — — Rep. U. S. Comm. Fish and Fisheries for 1885, p. 647, Pl. V, figs. 1—1e, Pl. VI, figs. 2—2 a.

Occurrence. This species has been taken once by the "Ingolf".

West of Iceland (halfway between Iceland and Greenland): St. 11: 64° 34' N. L., 31° 12' W. L., 1300 fm., temp. 16°; 1 spec.

Distribution. *M. similis* was founded on a specimen taken off the east coast of America at 39° 46½' N. L. in 1060 fm.; *M. crassa* Smith, to which *M. similis* appears to belong as a variety, was founded on a specimen taken off the east coast of America at 36° 16½' N. L., in 2574 fm. There is also considerable probability that *Munidopsis subsquamosa* var. *aculeata* Hend. belongs to *M. crassa* + *M. similis* and this form was taken by the "Challenger" west of Patagonia, 1450 fm. and "between Marion Island and the Crozets", 1375 fm.

Remarks. S. I. Smith founded *M. similis* on a single female, in which the carapace (with rostrum) was 24.2 mm. long; he states that it "is very closely allied to *M. crassa*, and will possibly prove to be a variety of it", but of *M. crassa* he had only seen his type-specimen, a very large female, in which the carapace with rostrum measured 65 mm. My single specimen, a female with eggs, stands nearer to *M. similis* than to *M. crassa*, but is somewhat larger than the former, as the carapace with rostrum is 40 mm., the rostrum itself 12.4 mm., and it differs from both and especially from *M. crassa* in that the rostrum is longer, narrower and more curved upwards and in that the spiny armature along the anterior margin of the carapace is reduced to but a single process outside the basis of the antennæ. The gastric area has two larger and five smaller spines as also a number of granules and on the posterior half a number of smaller, flat tubercles; the hepatic area has some smaller, round tubercles; on the posterior half of the carapace there are numerous raised portions which have a certain resemblance to transverse keels and are from three to more times as long as broad. The rostrum is strongly recurved, narrow in its distal two-thirds, upper margin keeled, under side flat and lateral margins with three to four serrations at the middle. The antero-lateral process on the carapace is of good size, another but smaller process is present about halfway between this and the basis of the antenna and between this and the rostrum the anterior margin is smooth; the lateral margin has some smaller spines, one or two of which are situated on the anterior angle of the posterior branchial area. The furrows between the different areas of the carapace are well-marked and smooth. The eyes, antennules and the limbs on the cephalothorax agree with the corresponding parts of *M. similis* in the features in which S. Smith finds differences between this form and *M. crassa*. The abdomen is essentially intermediate between those in *M. similis* and *M. crassa*. For the rest, my figures show all these features in my specimen.

The eggs are ca. 3 mm. in diameter. — Just after the specimen came up in the trawl, I noted that it was uniformly white with yellowish red eyes, while the eggs were bright scarlet red.

As a result of the above I have considered myself justified in referring my specimen to *M. similis* Smith; so long as it cannot be determined with certainty that this species should be included under *M. crassa* as a variety or only as a synonym, I have thought it best to keep the first name. Under "distribution" I have further expressed my views concerning *M. crassa*, *M. similis* and *M. subsquamosa* var. *aculeata* Hend.

### 30. *Uroptychus nitidus* A. M.-Edw. var. *concolor* A. M.-E.

1888. *Diptychus nitidus* A. Milne-Edwards, Bull. Mus. Comp. Zool. Vol. VIII, p. 62.

1894. — — — — —, var. *concolor*, A. Milne-Edwards & Bouvier, Ann. Sc. nat., Zool., Sér. 7, T. 16, p. 225, fig. 16, fig. 21.

! 1900. — — — — — A. Milne-Edwards & Bouvier, Exp. Scient. du Travailleur et du Talisman, Crust. Déc., I., p. 360, Pl. IV, fig. 4, Pl. XXXII, figs. 15–19.

Occurrence. The "Ingolf" has brought home a single specimen.

South-West of Iceland: St. 84: 62° 58' N. L., 25° 24' W. L., 633 fm., temp. 4.8°; 1 spec.

Distribution. The species was first taken by the "Blake", later by the "Challenger" at the

Antilles; A. M.-Edwards & Bouvier (Mem. Mus. Comp. Zool., XIX, p. 139) state: "L'espèce typique paraît être localisée dans la mer des Antilles....., elle ne remonte pas au-dessus de 80 brasses et descend jusqu'à 573", and they continue: "Elle est représentée dans les eaux orientales de l'Atlantique par la variété *concolor* A. Milne-Edwards et E. L. Bouvier du Talisman (495 à 1600 mètres), et dans le Pacifique oriental par la variété *occidentalis* Faxon de l'Albatross (495 brasses)". I think that "var. *concolor*" really belongs to *U. nitidus* as a variety; "var. *concolor*" has been taken by the "Caudan", "Travailleur" and "Talisman" in the Gulf of Gascogne and from there southwards to the Cape Verde Islands, in 495–1710 meters, also in the Indian Ocean off Cape Natal, 440 fm. (Stebbing). Alcock (1899) gives *U. nitidus* — presumably not the typical form but var. *concolor* — from the Laccadives, 636 fm., and from the Bay of Bengal, 320–296 fm. It appears to me somewhat more doubtful whether var. *occidentalis* Faxon is a variety of *U. nitidus* or an independent species, as Faxon (Mem. Mus. Comp. Zool. XVIII, p. 101) gives several differences between the two, but naturally I can contribute nothing to the solution of the question. Faxon has only had four specimens of his *U. nitidus* var. *occidentalis* from a station in the Gulf of Panama, 458 fm. (the 495 cited above from the French authors must have been an error in printing).

Remarks. I have compared the "Ingolf" specimen with two specimens of *U. nitidus* var. *concolor* taken by the "Talisman" and found complete agreement.

### 31. *Uroptychus rubro-vittatus* A. M.-Edw.

1881. *Diptychus rubro-vittatus* A. Milne-Edwards, C. R. Acad. Sc. 5. déc. 1881 (teste A. M.-Edw. & Bouvier).  
 1894. — — A. Milne-Edwards & Bouvier, Rés. des Camp. Sc. de l'Hirondelle, Fasc. VII,  
 p. 88, Pl. VI, figs. 1–12.  
 1900. — — A. Milne-Edwards & Bouvier, Exp. Scient. du Travailleur et du Talisman,  
 Crust. Déc., I, p. 356, Pl. XXXII, figs. 6–14.

Occurrence. This species was not brought home by the "Ingolf"; on the other hand it was taken by the "Thor" in 1903 at the following locality.

South of Iceland: 63° 12.5' N. L., 20° 06' W. L., 300 fm.; 13 spec.

Distribution. The species has been taken several times in the eastern Atlantic, namely, off northern Africa and southern Europe between 26° 20' N. L. and 46° 40' N. L. as also at the Azores (A. Milne-Edwards & Bouvier, Bonnier, Caullery). The depth was from 160 to 744 fm. Its occurrence south of Iceland is interesting.

Remarks. Some of the specimens taken are remarkable for their quite unusual size; they are much larger than those whose measurements are given in the literature and I may therefore give some details concerning them. The largest male has the following dimensions: length from tip of rostrum to end of abdomen 33 mm., thorax with rostrum 18 mm., left first leg 63 mm.; in the largest female with eggs the length of the body when stretched was 40 mm., of thorax with rostrum 17.7 mm., left first leg 56 mm.

## C. Macrura.

### 32. *Calocaris Macandreae* Bell.

1853. *Calocaris Macandreae* Bell, Brit. Stalk-eyed Crust. p. 233, with fig.  
 1892. — — — — — Ortmann, Zool. Jahrb., Syst., B. VI, p. 50, Taf. I, Fig. 5.  
 1901. — — — — — Alcock, Descr. Cat. Indian Deep-Sea Crust. Dec. Macr. and Anomala, p. 189.

Occurrence. The "Ingolf" has taken only one specimen of this species.

South of West Iceland: St. 69: 62° 40' N. L., 22° 17' W. L., 589 fm., temp. 3.9°; 1 spec.

Distribution. According to the literature the distribution of this species is as wide as it is remarkable. It was first observed on the west coast of Scotland at ca. 56° N. L., and also in Irish waters. On the south and west coasts of Norway it has been taken at a number of localities in deep water, down to 217 fm. at least; the most northerly of these places was Trondhjem Fjord (Storm, 1878); it was also taken at Bohuslän (Goës) and in the north-easterly part of the Kattegat, in 49 to 25 fm. (Meinert). It has been taken in the deep part of the western Mediterranean by the "Travailleur" (A. Milne-Edwards), also in the Adriatic in depths from 70 to 630 fm. On the east coast of America it has been taken in the Gulf of St. Lawrence in 190 fm. (Whiteaves, test. Smith). While there is no reason for doubt that all these indications refer to this species, the following two appear to me very remarkable. Kirk (test. Alcock & Anderson) states that he has found two dead specimens at New Zealand; Alcock also (l. c.) mentions some specimens from the Arabian Sea, 636 fm., and from the Bay of Bengal, off Ceylon, 800–637 fm. Unfortunately, Alcock says nothing as to how far he has made a direct comparison between European and Indian specimens, but he describes his Indian specimens and is so careful an observer on Decapoda that his determination should presumably be accepted.

Remarks. The single specimen lacked the first pair of thoracic legs and several other parts. It differs a little in the form of the rostrum from Danish specimens; in other details I found no difference.

### 33. *Polycheles sculptus* Smith.

- 1880, April. *Polycheles sculptus* S. I. Smith, Ann. & Mag. Nat. Hist. 5. Ser., Vol. V, p. 270.  
 1880, December. *Pentacheles spinosus* A. Milne-Edwards, Bull. Mus. Comp. Zool., Vol. VIII, p. 66.  
 1882. *Pentacheles sculptus* S. I. Smith, Bull. Mus. Comp. Zool., Vol. X, p. 23, Pls. III & IV.  
 1901. *Polycheles* — — — — — Alcock, Descr. Cat. of Ind. Deep-Sea Crust. Dec. Macr. and Anomala, p. 170.

Occurrence. The "Ingolf" has taken this beautiful species at a single station.

South of West Iceland: St. 69: 62° 40' N. L., 22° 17' W. L., 589 fm., temp. 3.9°; 1 spec.

Distribution. Smith gives it from various stations off the east coast of America between 35° 49½' N. L. and 43° 10' N. L., 250 to 843 fm. A. Milne-Edwards has had it from six stations in the West Indies, depths from 611 fm. to "1568–1400" fm. It is also known from the Gulf of Gascogne, depths from 346 to 638 fm. (Caullery), from the Mediterranean north-west of Sardinia, 1140 fm. and lower to 1494–1508 fm. (Senna), from the Indian Ocean off Cape Natal, 440 fm. (Stebbing) and from the Arabian Sea, 738, 824 and 836 fm. (Alcock). Faxon mentions a form, which he with

good reason considers a local variety and calls *P. sculptus pacificus* Fax., from the Pacific off the west coast of America between Ecuador and the northern tropics, depths from 511 to 1270 fm.

Remarks. The single specimen is a male 84 mm. long; it agrees excellently with Smith's description.

### 34. *Polycheles nanus* Smith.

1884. *Pentacheles nanus* S. I. Smith, Rep. Comm. Fish & Fisher. f. 1882, X, p. 359.

! 1886. — — S. I. Smith, — — — — f. 1885, XIII, p. 651, Pl. VII, figs. 1—1a.

1895. *Polycheles* — Faxon, Mem. Mus. Comp. Zool., Vol. XVIII, p. 121, Pl. XXXIII, figs. 1, 1a, 1b.

Occurrence. The "Ingolf" has taken this species at the following 12 stations.

Davis Straits: St. 36: 61° 50' N. L., 56° 21' W. L., 1435 fm., temp. 1°5'; 2 spec.

West of Iceland: St. 10: 64° 24' N. L., 28° 50' W. L., 788 fm., temp. 3°5'; 2 spec.

South-West of Iceland: St. 18: 61° 44' N. L., 30° 29' W. L., 1135 fm., temp. 3°0'; 6 spec.

— — — — 83: 62° 25' — 28° 30' — 912 — — 3°5'; 10 spec.

— — — — 76: 60° 50' — 26° 50' — 806 — — 4°1'; 3 —

— — — — 74: 62° 17' — 24° 36' — 695 — — 4°2'; 1

South of Iceland: St. 68: 62° 06' N. L., 22° 30' W. L., 843 fm., temp. 3°4'; 1 spec.

— — — — 67: 61° 30' — 22° 30' — 975 — — 3°0'; 2 —

— — — — 40: 62° 00' — 21° 36' — 845 — — 3°3'; 3 —

— — — — 66: 61° 33' — 20° 43' — 1128 — — 3°3'; 1 —

— — — — 64: 62° 06' — 19° 00' — 1041 — — 3°1'; 2 —

— — — — 41: 61° 39' — 17° 10' — 1245 — — 2°0'; 1 —

Distribution. S. I. Smith mentions the species from a large number of stations off the east coast of America between ca. 35° and 41° N. L. in depths from 707 to 1917 fm.; Caullery notes it from a station in the Gulf of Gascogne in the relatively small depth of 355 fm., and Stebbing from South Africa, not far from Cape Point, 750—800 fm. Faxon notes it from the Pacific off the west coast of America between 0° 36' S. L. and 7¼° N. L. in depths between 899 and 1522 fm. The species has thus been taken once in ca. 355 fm. but otherwise in the most different depths between 695 and 1917 fm.

Remarks. The largest "Ingolf" specimen, a female with eggs, is 74 mm. long and came from St. 40; two other females with eggs measure 55 and 59.5 mm. in length and are from St. 18 and St. 41.

When Smith founded the species and gave good characters for it, he remarked at the same time that it "will possibly prove to be only a dwarf deep-water variety of *P. sculptus*" — but with this I cannot agree. My "Ingolf" material is very considerable and gives no indication of *P. nanus* being a variety. Further, Smith himself says: "the distinctive characters are well-marked and very constant in all the large number of specimens seen". Faxon states that his sixteen specimens from the Pacific differ from Atlantic specimens in that the keels and tubercles on the 6<sup>th</sup> and 7<sup>th</sup> abdominal segments are lower than in the latter, and he adds: "In these regards the Pacific form resembles *P. sculptus*, adding weight to Professor Smith's suggestion that *P. nanus* may be only a dwarf deep-water variety of *P. sculptus*". The characters indicated by Faxon appear to me however so unimportant in comparison with the remaining characters that *P. nanus* must remain an independent species well-marked off from *P. sculptus*.



I have observed a little variation in the spiny armature on the scutum. The general rule is as described by Smith: "on the middle line of the gastric region back of the two rostral spines there are, at nearly equal distances, first two single spines, one behind the other, than a pair close together, and lastly a single one". In a specimen from St. 18 there is in the middle line three unpaired spines between the frontal and the set of paired spines further back; in a specimen from St. 36 there were on the same line four unpaired spines, the first two closely behind one another; lastly, in a specimen from St. 40 five unpaired spines were present on this line, the three anterior being smaller than the two others and so close together that they are joined at the basal ends.

### 35. *Nephropsis atlantica* Norm.

! 1882. *Nephropsis atlantica* Norman, Proceed. Roy. Soc. Edinb., Vol. XI, p. 684.

1896. — — Caullery, Ann. de l'Univ. de Lyon, 1896, p. 384.

1901. — — Alcock, Descr. Cat. of Ind. Deep-Sea Crust. Macr. & Anomura, 1901, p. 161.

Occurrence. This form was not taken by the "Ingolf".

South-West of the Færoes: 61°08' N. L., 9°46' W. L., 450 fm., ("Mich. Sars" 1902); 1 large male (Bergen Mus.).

— — — 59°28' — 8°01' — 687-580 fm., — — 1 small spec. —

Distribution. This species was first discovered in the Færoe Channel, 555 fm., temp. 55° (Norman) and the specimens just mentioned also come from the same region. Later, it was taken by the "Thor" at 49° 25' N. L., 12° 20' W. L., 678-628 fm., and in the Gulf of Gascogne in 350 fm. (Caullery); Stebbing notes it from a spot ca. 5 miles north east of Cape Natal and Alcock from the Arabian Gulf near the Laccadives and further north, 636-740 fm.

Remarks. The large specimen is 103 mm. long, right chela 27 mm., the best preserved flagellum on the antennæ measures 237 mm. though its distal end is broken off. Norman gives five spines on the carpus of the first pair of thoracic legs, but my large specimen has six; Smith gives three spines in his *N. aculeatus*, which to judge from the description (Proc. U. S. Nat. Mus. Vol. III f. 1880, p. 431) must be a different species from *N. atlanticus*.

### 36. *Nephrops norvegicus* L.

1758. *Cancer norvegicus* Linné, Syst. Nat., Ed. X, p. 632.

! 1853. *Nephrops* — Bell, Brit. Stalk-eyed Crust. p. 251, with fig.

1863. — — Heller, Crust. südl. Europa, p. 220.

Occurrence. The "Ingolf" has not taken this species, but it was brought home by the "Thor" both in 1903 and 1904. Adult specimens came from the two localities.

South of Iceland: 63° 16' N. L., 19° 57' W. L., 138-207 fm.

— — — 63° 29' — 21° 25' — 50-69 fm.

Dr. Schmidt tells me that this species was taken by the "Thor" in quantities in this district south of western Iceland and it was so common that it formed the chief food of the cod. The "Thor" took the small pelagic specimens and larvæ in and near the area indicated by the latitude and longitude of the two stations; a young specimen was also taken near Skagi (a little north of Reykjanaes, south-west corner of Iceland).

**Distribution.** It is remarkable that this species is not known from the Færoes, the Shetlands or the Hebrides. It occurs at Scotland, England and Ireland (Bell), on the Belgian coast (v. Beneden), at Concarneau (Bonnier) and in the Gulf of Gascogne, 136 fm. (Caullery); in the Mediterranean it is known from several points along the Italian west coast and in the Adriatic. It is met with in the Skager Rak, northern Kattegat and a considerable distance down into the Sound (Meinert); it is found at Bohuslän (Goës) and along the whole west coast of Norway (M. Sars). Finally its occurrence in Varanger Fjord and in the western part of the Murman Sea has been stated by Birula, but Appellöf doubts that the species has been taken east of North Cape.

### **Spongicoloides** n. gen.<sup>1</sup>

Body smooth, with exception of about half of the carapace which is adorned with a number of small spines. Rostrum short, compressed. Telson has the posterior end broad and flatly rounded; it is a little longer than the uropods, and with two longitudinal rows of teeth on the upper surface. The exopod of the uropods has no transverse fissure.

Eye-stalks short; eyes of moderate size, with whitish pigment. The antennular peduncle short; its basal point not concave dorsally. The antennal squama of considerable size, with its distal end broadly rounded inside the marginal spine.

First maxillipeds have the exopod well developed; second and third maxillipeds completely without exopod. The three anterior pairs of trunk-legs increase in length in posterior succession so much that the third pair are nearly twice as long as the first. Third pair have the carpus oblong, not triangular, the chela long, very slender, formed essentially as in the two preceding pairs. — Fourth and fifth pairs of legs have their distal joints undivided; seventh joint terminates in a claw and behind this a somewhat smaller claw-shaped spine is seen.

The abdominal appendages behind the first are biramous.

Eggs very large.

The branchial formula is as follows:

Appendages	Epipods and Podobranchiæ	Arthrobranchiæ	Pleurobranchiæ
Mxp <sup>1</sup> .....	ep.....	I (rudimentary)...	O
Mxp <sup>2</sup> .....	ep + podobr. (rudimentary).	I (rudimentary)...	O
Mxp <sup>3</sup> .....	ep.....	I .....	I
Trl <sup>1</sup> .....	O.....	I .....	I
Trl <sup>2</sup> .....	O.....	I .....	I
Trl <sup>3</sup> .....	O.....	I .....	I
Trl <sup>4</sup> .....	O.....	I .....	I
Trl <sup>5</sup> .....	O.....	O .....	I

<sup>1</sup> The descriptions of the genus and the species are written tolerably in accordance with those given by Prof. A. Alcock of forms of the same family in his valuable work: A descriptive Catalogue of the Indian Deep-Sea Crustacea Decapoda and Anomala, in the Indian Museum. 1901.

Remarks. According to Alcock an exopod is well developed on the external maxillipeds of *Engystenopus* and *Richardina*, while it is quite rudimentary in *Spongicola* (in *S. Kochleri* Caullery I have been unable to find even a rudiment); in *Stenopus* the third maxillipeds possess an exopod. The new genus *Spongicoloides* is more allied to *Spongicola* than to the three other genera in having no exopod on the third maxillipeds, but it differs sharply from all in having no exopod on the second maxillipeds (according to my own observation *Spongicola* has a well developed exopod on  $mxp^2$ ). In *Spongicoloides* the shape of the carpus and the chela of the third pair of trunk-legs is nearly similar to that in *Richardina* — consequently very different from *Spongicola* and *Engystenopus* — but in *Richardina* the distal joints in the two posterior pairs of trunk-legs are again divided into joints, while they are undivided in *Spongicoloides*. But the branchial formula differs extremely from what is found in the other genera named. These possess two arthrobranchiæ and an epipod on  $mxp^3$  and  $trl^1$  to  $trl^4$ , but in *Spongicoloides* the same five pairs of appendages have only a single arthrobranchia (the anterior being absent), and besides  $trl^1$  to  $trl^4$  have no epipod. Finally, in *Spongicoloides* the branchiæ of the trunk-legs are less developed, with their branches much shorter (Pl. IV, fig. 1 i) than for instance in *Spongicola*. — In general aspect this interesting new genus shows more resemblance to *Richardina* (according to Alcock's figure of that form) than to any of the other genera.

### 37. *Spongicoloides profundus*, n. sp.

Pl. III, figs. 5 a—5 k; Pl. IV, figs. 1 a—1 l.

Description. The carapace, which is of very thin texture, is moderately short, slightly compressed and dorsally vaulted, with a number of small spines scattered on the anterior two thirds of the dorsal surface and on the anterior third of the lower part of the sides. The rostrum, which reaches only to the end of the basal antennular joint, is irregularly serrated above (figs. 5 b, 5 c, 5 d), in two specimens with respectively three and two, in a third specimen with no spines on the lower edge behind the acute tip. The eyes are of moderate size, with whitish pigment; the short eye-stalks have no spines.

The antennal squama (fig. 5 f) is slightly more than twice as long as broad; the distal half or two fifths of its outer margin has 4—6 teeth, and the arched front margin overreaches the apical marginal spine. Third maxillipeds somewhat shorter than  $trl^1$ ; their ischium and merus distinctly broadened.

The first three pairs of trunk-legs are truly chelate. First pair (figs. 1 d and 1 e) slender, shorter, slightly more than half as long as the third pair; second pair only a little shorter than the third, reaching about to the base of its movable finger, but its distal half is much more slender than that of the third pair. Third pair (fig. 1 f) with the carpus somewhat more than twice as long as broad; the chela is nearly as long as the sum of ischium, merus and carpus, besides extremely slender, being  $5\frac{1}{2}$  times as long as broad. Fourth and fifth pairs of legs (fig. 1 g) have the carpus even a little more than twice as long as the propodus, and both joints show no vestige of subdivision; the terminal part of these legs is shown in fig. 1 h.

The abdomen is smooth, only the telson has two considerably diverging longitudinal rows of

teeth on the surface (fig. 11), and the surface between these rows is concave. First pleopods in the female uniramous. The uropods have the outer margin of the exopod serrated almost to the base (fig. 11).

The eggs are few and very large.

Length of the largest specimen, an ovigerous female, 24 mm.

Occurrence. The specimens seen have been taken by the "Ingolf".

South-West of Iceland: St. 78: 60° 37' N. L., 27° 52' W. L., 799 fm., temp. 4.5°; 4 spec.

Among the specimens two are ovigerous females; the third specimen is scarcely adult, and the fourth only half-grown. The station is very interesting: the trawl came up filled with enormous quantities of various sponges, and the number of species of Malacostraca (especially belonging to the orders Tanaidacea, Isopoda and Amphipoda) is really astonishing, probably larger than in any other single haul secured during any expedition.

### 38. Crangon Allmani Kin.

1857. Crangon Allmani Kinahan, Nat. Hist. Review, Vol. IV, p. 81 (teste Kinahan).

! 1864. — — — Proc. Roy. Irish. Acad., Vol. VIII, p. 71, Pl. IV.

Occurrence. This species has not been brought home by the "Ingolf", but it has been taken a number of times by different zoologists especially of recent years.

West coast of Iceland: 65° 52' N. L., 23° 58' W. L., 32 fm., "Thor" 1904.

— - — Faxa Fjord, soft mud and Laminaria. R. Horring; 1 spec.

— - — Skagi, 21 fm., "Thor" 1904.

South-West of Iceland: 63° 46' N. L., 22° 56' W. L., 80 fm., "Thor" 1904; many spec.

South of Iceland: West of Geirfugleskjær, Young-fish trawl, 100 m. wire out, "Thor" 1904; 6 spec.

— - — 63° 30' N. L., 17° 31' W. L., 92 fm., mud, temp. 4.7°; Wandel 1891, 1 spec.

— - — 63° 50' — 16° 31' — 31 fm., "Thor" 1904; 3 spec.

South-East coast of Iceland: Lomsvig, 21 fm., A. C. Johansen; 1 spec.

Færoes: 6 miles N. W. of Kalsö, 60 fm., Th. Mortensen; 2 spec.

— Trangisvaag, 1—3 fm. and 8—9½ fm., Dr. Jørgensen; 4 spec.

Distribution. The species has previously been taken at Reykjavik in 20—30 fm. (G. O. Sars), the Shetland Isles in deep water (Norman), the Hebrides (Norman), from there southwards on the coasts of Great Britain and Ireland (various authors); further, at Holland (Hoek), various places in the North Sea (Metzger); Skager Rak, Kattegat, within the northern part of the Sound in depths from 6½ to 50 fm. (Meinert); also, Bohuslän (Goës), south and west coast of Norway to Lofoten (G. O. Sars), western Finnmark (Birula, Appellöf), western part of the Murman south coast to the entrance to the White Sea, 61—67 fm. (Birula) and 35 fm. (Doflein); lastly, in the western half of the White Sea especially in Onega Bay in 4—9 fm. (Birula). — It is thus a markedly boreal species which lives in depths from but a few fathoms down to almost 100 fm.

Remarks. I agree with the view accepted by Norman, G. O. Sars and some other authors that *C. Allmani* is an independent species. The largest specimen I have seen is 63 mm. long; it has come either from Iceland or the Færoes.

39. *Cheraphilus neglectus* G. O. Sars.

1882. *Cheraphilus neglectus* G. O. Sars, Overs. Vid. Selsk. Forh. Christiania f. 1882, Nr. 18, p. 45, Tab. I, Fig. 6.

Occurrence. The "Ingolf" has not taken this species, but it has been several times found of recent years at Iceland and the Færoes.

South coast of Iceland: West of Geirfugleskjær, Young-fish trawl, 100 m. wire out, "Thor" 1904; great quantity, very small spec.

South coast of Iceland: 63° 27' N. L., 19° 37' W. L., 45 fm., "Thor" 1904; 8 spec.

— — — — 63° 42' — 17° 34' — 48—37 fm., "Thor" 1903; 6 spec.

— — — — 63° 42' — 16° 32' — 29—25 — "Thor" 1903; 1 —

— — — — 63° 50' — 16° 31' — 31 fm., "Thor" 1904; 1 spec.

Distribution. G. O. Sars writes that this species occurs on the south and west coasts of Norway in 2 to 6 fm.; it has been taken later in the Moray Firth, 7—8 fm., and the Firth of Forth (Th. Scott) and west of Ireland, 15 fm. (Walker). It has of course a much wider distribution.

Remarks. Several of my specimens are adult females with eggs, but they are only 14—16 mm. long, thus considerably smaller than the measurement given by Sars, 26 mm. I have compared my specimens with a 19 mm. long, considerably plumper and egg-bearing female of *Ch. neglectus* kindly lent me by Prof. G. O. Sars, and thus made certain that the last-named and my specimens belonged to the same species. Both his female and my specimens differ however from Sars' description in that the carapace and abdomen are not smooth; the carapace has always a considerable number of very small raised granules, the abdomen has in part some depressed 2 points, in part and chiefly laterally some extremely small raised granules, but these are nevertheless much weaker than in *Ch. nanus* Kr. Both the specimen received from Sars and mine differ from *Ch. nanus* in that the end of the rostrum is somewhat broadly rounded, whilst in *Ch. nanus* this is somewhat prolonged; further, in the latter form the integuments are much more granulous with more developed posterior median spine and more distinct rudiments of sublateral keels on the carapace. On the other hand, the other characters given by Sars do not seem reliable: the antennular peduncles are scarcely shorter in *Ch. nanus* than in *Ch. neglectus*, and I have not been able to find keels on the 6<sup>th</sup> abdominal segment in Danish specimens of *Ch. nanus*. There is also no dark cross-band on the 4<sup>th</sup> abdominal segment in my specimens of *Ch. neglectus*. — I am not at all certain that *Ch. neglectus* Sars is a species distinct from *Ch. nanus* Kr.; it seems to me not altogether improbable that investigation of a larger material from different localities will show, that *Ch. neglectus* is only a smoother variety. But I accept it here as a species nevertheless, as my material of *Ch. nanus* is too small to settle the question.<sup>1</sup>

40. *Sclerocrangon boreas* Phipps.

1774. *Cancer Boreas* Phipps, Voy. towards the North Pole, p. 190, Tab. XII, fig. 1.

! 1842. — — Krøyer, Naturh. Tidsskr., B. IV, p. 218, Tab. IX, Fig. 1—14.

<sup>1</sup> A long time after this text was written Appellöf published his important paper: Die Dekapoden Crustaceen, 1906. On pag. 130 he is inclined to think, that *Ch. neglectus* G. O. S. must be cancelled, and he refers it with a query as a synonym to *Ch. bispinosus* Hailst., while *Ch. nanus* Kr. is considered a synonym to the last-named form.

Occurrence. This species was taken by the "Ingolf" at 5 places:

Baffins Bay: St. 33: 67° 57' N. L., 55° 30' W. L., 35 fm., temp. 0.8°; 8 spec.

Davis Straits: St. 29: 65° 34' N. L., 54° 31' W. L., 68 fm., temp. 0.2°; 1 spec.

— — 34: 65° 17' — 54° 17' — 55 — — 0.9°; 5 —

North-West Iceland: Dyre Fjord; 3 spec.

North of Iceland: St. 127: 66° 33' N. L., 20° 05' W. L., 44 fm., temp. 5.6°; 2 spec.

In Malac. Groenl. I have mentioned a very large number of localities for this species: it goes northward to Discovery Bay at 81° 44' N. L. and is uniformly distributed along the west coast of Greenland from Cape York to Cape Farewell; it was taken at all depths from ca. 5 fm. to 118 fm., but a single occurrence at 200 fm. must (for reasons given) be considered as less certain. Since that paper was written I have seen many specimens from various localities at West Greenland, but neither these nor the data published by Ortmann and Ohlin increase our knowledge of the bathymetric or geographical distribution of the species. From the east coast of Greenland I gave it in 1895 as taken in Hekla harbour at 70° 27' N. L. in 1—3 fm., 10 fm., and 7—17 fm.; Ohlin gives it from 74° 10' N. L. near Clavering Island, 13—21 fm.; later, I have seen specimens from the following East Greenland localities: Angmagsalik, 65° 37' N. L., many specimens; 69° 44' N. L., 23° 30' W. L. in the eel-seine in 3—0 fm., many specimens; Cape Tobin, 70° 23' N. L., 22° W. L., 57 fm., 2 specimens; Forsblad Fjord, 72° 27' N. L., 25° 28' W. L., 90—50 fm., 1 specimen; Sabine Island, 74° 30' N. L., 18° 45' W. L., anchorage, 3 specimens. Buchholz had already given it from Sabine Island, 10—20 and 27 fm., and from Jackson Island (73° 34' N. L.); Koelbel notes it from Jan Mayen. Further, I have seen a number of specimens from the west, north and east coasts of Iceland, but none from the very south, which however is certainly accidental as it is common at the Færoes, having been taken in Vaag Fjord, Tveraa, Trangisvaag, Svinø, Kvannesund, Vestmannaeyri and off Nólsoy; the depths were from 1—3 fm. and down to 100 fm.

Distribution. It cannot yet be settled if the species is circumpolar. At Norway it is found at Lofoten and Finmark (G. O. Sars), from there eastward in the Murman Sea, the White Sea (Birula) and in the Kara Sea, 43—72 fm. (Ruijs), to the south-west coast of Nova Zembla (Hansen); it has been taken in the Barents Sea in 140 fm. (Hoek) and is known also from Franz Joseph Land (Scott) and is common at Spitzbergen (several authors). It occurs, as mentioned above, at Grinnell Land, also at Labrador and southward along the east coast of America to Cape Cod, 5—36 fm. (S. I. Smith). It has further been taken almost midway on the north coast of Alaska, in the Behring Straits, along the west side of Alaska, at the Aleutians and north-eastern Siberia (Mary Rathbun, 1904); its occurrence at California, Kamtschatka and north of the most eastern part of Asia as given by Owen, Ross, Stuxberg I consider unreliable. Further, Brandt's statement of its occurrence in the Siberian Polar Sea requires confirmation, and as it is far from common in the Kara Sea it is until further information is forthcoming uncertain whether it is absent or not along the 120 degrees of latitude north of Asia. — The greatest depth at which the species has been found with certainty is 140 fm. (Hoek).

Remarks. The largest specimen is from West Greenland and measures 137 mm. from the tip of the rostrum to the end of the telson.

41. *Sclerocrangon ferox* G. O. Sars.

1877. *Cheraphilus ferox*, G. O. Sars, Arch. f. Math. og Naturv., B. II, p. 239.

1882. — — Hoek, Nied. Arch. f. Zool., Supplb. I, p. 9, Taf. I, Fig. 3.

! 1885. *Sclerocrangon salebrosus*, G. O. Sars, Norske Nordhavs-Exped., Crust. I, p. 15, Pl. II.

1887. — *ferox*, H. J. Hansen, Dijnphna-Togt. zool.-bot. Udb., p. 236.

Occurrence. The "Ingolf" has taken this species at two stations.

South of Jan Mayen: St. 116: 70° 05' N. L., 8° 26' W. L., 371 fm., temp.  $\div$  0.4°; 3 spec.

North of the Færoes: - 143: 62° 58' — 7° 09' — 388 — —  $\div$  0.4°; 4 —

In Malac. Groenl. I have mentioned it from 4 localities in Baffins Bay; the most northerly and deepest of these was 75° 26' N. B., 260 fm. It was taken by the 2<sup>nd</sup> Amdrup Expedition in the northern part of East Greenland at two places: Fleming Inlet, 71° 51' N. L., 22° 27' W. L., 118 fm., red clay, 4 specimens, and Forsblad Fjord, 72° 27' N. L., 25° 28' W. L., 90—50 fm., clay with stones and gravel, 2 specimens. One specimen was taken by the Ryder Expedition at 74° 17' N. L., 15° 20' W. L., 127 fm., muddy bottom with small stones. Ohlin gives a number of localities along the same part of East Greenland in ca. 50 to 150 fm. At Jan Mayen it was taken in 143 fm. (Koelbel).

Distribution. The species has been taken N. E. of the Shetlands at 62° 15' N. L., 0° 37' E. L., 356 fm. (Ohlin); off the west coast of Norway: 63° 10' N. L., 5° 0' E. L., 417 fm., temp.  $\div$  1.0° (G. O. Sars); Jan Mayen, 95 fm., temp.  $\div$  0.6° (G. O. Sars); in the waters of Spitzbergen at a number of localities, in depths from ca. 50 fm. down to 532 fm. (Sars, Ohlin, Doflein, Birula), whilst the temperature is stated to vary between + 2° and  $\div$  1.71°; the most northerly of these places was north of Spitzbergen at 81° 20' N. L. (Doflein). It has also been taken in the northern part of the Murman Sea (Birula), in the Barents Sea (Hoek, Stebbing) and it is common in the Kara Sea in 49—91 fm. (Hansen), but it is not known further to the east.

In the Bih. K. Sv. Vet.-Akad. Handl. B. 27, Afd. IV, No. 8, Ohlin (p. 28—29) discusses in detail the distribution of this species with regard to depth and temperature in comparison with *Scl. boreas*. *Scl. ferox* does not go into shallower water than ca. 50 fm. and is most often met with in depths from 100 to 400 fm.; its frequency in the Kara Sea and occurrence in the cold area of the Norwegian Sea shows that it is a typically arctic species; it has been taken seven times in places with the bottom temperature above 0° (from 0.3° to 2°) and thirteen times where the temperature at the bottom was negative (from  $\div$  0.1° to  $\div$  1.7°) (Birula). *Scl. boreas* does not occur in the Kara Sea or in the cold area mentioned and has not been taken with certainty in deeper water than 140 fm., whilst it is common in much shallower water even into 3—0 fm. It has never as yet been taken with the other species.

Remarks. The largest Greenland specimen is from Forsblad Fjord; it is 128 mm. long; the largest specimen from the Kara Sea is 130 mm.

42. *Nectocrangon lar* Owen.

1838. *Crangon lar* Owen, Zool. of Capt. Beechey's Voy., p. 88, Pl. XXVIII, fig. 1.

! 1842. *Argis lar* Krøyer, Naturh. Tidsskr., B. IV, p. 255, Tab. V, Fig. 45—62.

1904. *Nectocrangon lar* M. Rathbun, Harriman Alaska Exped., p. 137, with figs.

1904. — *dentata* M. Rathbun, Harriman Alaska Exped., p. 138, with figs.

Occurrence. The "Ingolf" has taken this species at 4 stations:

Baffins Bay: St. 33: 67° 57' N. L., 55° 30' W. L., 35 fm., temp. 0.8°; 4 spec.

Davis Straits: St. 31: 66° 35' N. L., 55° 54' W. L., 88 fm., temp. 1.6°; 1 spec.

— — — 29: 65° 34' — 54° 31' — 68 — — 0.2°; 4 —

— — — 26: 63° 57' — 52° 41' — 34 — — 0.6°; 1 —

In Malac. Groenl. I have given a large number of localities along the west coast of Greenland from 72° 23' N. L. to 60° 43' N. L.; later, Ortmann has given some places in Smith Sound, the most northerly at ca. 79° N. L. On the east side of Greenland it has been taken at: Angmagsalik (ca. 65½° N. L.), 9—0 fm., in the eel-seine, 8 specimens (Amdrup Expedition); Cape Tobin, 70° 23' N. L., 22° W. L., 57 fm., clay with stones, 2 specimens (Amdrup Exp.); Hekla Harbour in Scoresby Sound, 70° 27' N. L., 26° 12' W. L., 5 specimens (Ryder Exp.); Forsblad Fjord, 72° 27' N. L., 25° 28' W. L., 90—50 fm., clay with stones and gravel, 1 specimen (Amdrup Exp.); it is also given from two East Greenland localities: Kaiser Franz Joseph Fjord, 117 fm., clay, and 72° 45' N. L., 22° 58' W. L., 18—32 fm., clay (Ohlin). It has not been found at Iceland.

Distribution. On the east coast of North America the species begins at about 43° N. L. a little south of Nova Scotia; off this peninsula it was taken in depths between 26 and 59 fm.; from there it goes north to the St. Lawrence estuary, Newfoundland and Labrador (S. I. Smith). It has also been taken at Point Barrow on the western part of the north coast of North America (Murdoch), at the north east corner of Asia (Stuxberg), through Behring Straits and Bering Sea along Alaska southwards to 56½° N. L., along the coast of Asia at Kamtschatka, in the Sea of Ochotsk and at the Kuriles, 6—47 fm. (Mary Rathbun); finally, it is given from Vancouver Island, which lies at 50° N. L. to the north of California (Smith).

The description I gave in Malac. Groenl. p. 38 of the bathymetric occurrence etc. of the species agrees exactly with the observations to hand; it was as follows: "It is already met with in 4—8 fm., most frequently in 15—20 fm., but is nevertheless not rare in 100—120 fm. It has not been found in greater depths than 120 fm. It is often found on muddy bottom, but is not rare on algal grounds, stones or sand."

Remarks. Smith states (Rep. Progr. Geol. Survey Canada 1878—79, p. 212 B), that his specimens from Vancouver Island differ from the Atlantic specimens in several small respects; Holmes (Occas. Papers Calif. Ac. Sc. VII, 1900, p. 178) says that a specimen from Alaska agrees exactly with specimens from the Atlantic, but that specimens taken between Alaska and Vancouver Island formed a transition between specimens from the last-named island and from the Atlantic. Ohlin gives the largest specimen as 95 mm., two specimens from Angmagsalik and Forsblad Fjord are 92 mm.; one of the largest specimens from West Greenland is 85 mm.

In 1902 Miss Rathbun founded a new species, *N. dentata* which, according to her description given in 1904, differs from *N. lar* in two characteristics, to which a third difference may be added according to her figures, namely, the form of the antennal squama. She says regarding *N. dentata* that it is "very closely allied" to *N. lar*, "it differs chiefly in the carina of the sixth abdominal segment terminating posteriorly in a small sharp tooth or spine". Though it is not expressly stated in her diagnosis of *N. lar*, this "tooth or spine" should be absent in this species. An investigation of



my material of *N. lar*, amongst which are Krøyer's type-specimens, has shown me that the carina mentioned ends in a right-angled or pointed tooth sharp to the touch. I find that my *N. lar* in the form of the posterior edge of the carina, in the slender form of the 1<sup>st</sup> thoracic hand, but not in the form of the squama, agrees better with *N. dentata* Rathb. than with *N. lar* sens. Rathbun. And I believe that *N. lar* Kr. is identical not only with *N. dentata* Rathb. but likewise with *N. lar* sens. Rathb., and that future investigations will come to the same conclusion as mine, namely, that Miss Rathbun's two species cannot be separated from one another. According to the founder, the *N. dentata* has almost precisely the same geographical distribution as her *N. lar*, but is found in from 6 to 96 fm.; she also ascribes specimens from Granville Bay (between 76° and 79° N. L.) on the west coast of Greenland to *N. dentata*. I have mentioned the whole question in such detail, because the literature thus gives a *Nectocrangon dentata* as occurring at West Greenland, which belongs to the area dealt with in this paper.

#### 43. *Sabinea hystrix* A. M.-Edw.

1881. *Paracrangon hystrix* A. Milne-Edwards, Ann. Sc. Nat., 6. Sér., Zool., T. XI, p. 6.

! 1882. *Sabinea princeps* S. I. Smith, Bull. Mus. Comp. Zool., Vol. X, p. 38, Pl. VIII, figs. 1—1 b.

Occurrence. The "Ingolf" has taken this beautiful form at 3 stations.

Davis Straits: St. 28: 65° 14' N. L., 55° 42' W. L., 420 fm., temp. 3.5°; 1 spec.

— — — 27: 64° 54' — 55° 10' — 393 — — 3.8°; 4 —

South-West of Iceland: St. 83: 62° 25' N. L., 28° 30' W. L., 1912 fm., temp. 3.5°; 1 spec.

Distribution. Previously the species was only known from Guadeloupe, 734 fm., and off the east coast of America between 35° 45' N. L. and 41° 53' N. L. in depths from 353—888 fm. The distribution of this Atlantic form far up in the Davis Straits is interesting.

Remarks. The largest specimen, a fine female with eggs, is 114 mm. and was taken at St. 27.

#### 44. *Sabinea Sarsii* Smith.

1879. *Sabinea Sarsii* S. I. Smith, Trans. Conn. Acad., Vol. V, p. 59, Pl. XI, figs. 6—8.

1886. — — — Rep. Comm. Fish and Fisher. f. 1885, Pl. X, figs. 3, 3 a, 4

Occurrence. Has been taken by the "Ingolf" at 3 stations:

Davis Straits: St. 31: 66° 35' N. L., 55° 54' W. L., 88 fm., temp. 1.6°; 14 spec.

West of North Iceland: St. 15: 66° 18' N. L., 25° 59' W. L., 330 fm., temp. ÷ 0.75°; 3 spec.

North of the Færoes: St. 143: 62° 58' — 7° 09' — 388 — — ÷ 0.4°; 1 —

In Malac. Groenl. this species is mentioned from two localities in the Davis Straits; later, I have obtained it from three others (apart from the "Ingolf"); a resumé of my knowledge of its occurrence in the waters mentioned would read as follows: it is taken between 66 $\frac{1}{2}$ ° and 63 $\frac{1}{2}$ ° N. L. in depths from 67 to 140 fm. I have further seen specimens from the following localities;

Northern Iceland: Skagestrandsbugten, 119 fm., temp. 2.9°, mud, Wandel; 1 spec.

— — — 66° 17' N. L., 18° 13' W. L., 50 fm., mud, "Thor" 1903; 1 spec.

West of Iceland: 66° 20' — 25° 12' — 96 fm., temp. 6.5°; mud, "Thor" 1903; 4 spec.

West of Iceland:  $65^{\circ} 16' \text{ N. L.}$ ,  $25^{\circ} 20' \text{ W. L.}$ , 287 fm., mud, "Thor" 1903; 3 spec.

South of Iceland:  $63^{\circ} 35' \text{ N. L.}$ ,  $21^{\circ} 38' \text{ W. L.}$ , 80 fm., temp. ?; mud, "Thor" 1903; 1 spec.

South-East coast of Iceland: 3–4 miles from land, Dr. Jorgensen; 1 spec.

East of Iceland:  $64^{\circ} 16' \text{ N. L.}$ ,  $11^{\circ} 15' \text{ W. L.}$ , 198 fm., Wandel; 1 spec.

East of south end of Færoes:  $61^{\circ} 23' \text{ N. L.}$ ,  $5^{\circ} 04' \text{ W. L.}$ , 255 fm., temp.  $0^{\circ}$ , Wandel; 3 spec.

Distribution. It may be probable that the specimen noted by Norman from the Shetland Isles as *S. septemcarinata* in reality belongs to *S. Sarsii*. Specimens have been taken in the Skager Rak north of the Skaw, 70 fm., by Dr. Joh. Petersen, and off the south coast of Norway, 60–80 fm. (Appellöf). Sars writes that the species "occurs not so very rarely on our west coast (f. inst. Christiansund) and goes south to Stavanger [ca.  $59^{\circ} \text{ N. L.}$ ]." It is also found at East Finmark (Norman), at the western part of the coasts of the Murman Sea as far as to the entrance to the White Sea, 40 to 178 fm. (Birula), lastly, on the east coast of North America in the Gulf of Maine in 60 to 183 fm. (Smith) and south of Halifax, Nova Scotia (Bate).

*Sab. Sarsii* thus occurs in 40 to 388 fm. and in temperatures on both sides of  $0^{\circ}$ , but its absence at East Greenland, Franz Joseph Land, in the Kara Sea etc. shows that it is not so distinctly an arctic species as *S. septemcarinata*. In the western part of the Murman Sea both species are found together (Birula); in the waters about Iceland and in the Davis Straits they have not once been taken together; further, *S. Sarsii* goes deeper down than *S. septemcarinata* and is not found in so shallow water as this.

#### 45. *Sabinea septemcarinata* Sab.

1824. Crangon septemcarinatus Sabine, Suppl. to the App. to Parry's Voy. 1819–20, p. CCXXXVI, Pl. II, figs. 11–13.

! 1842. *Sabinea septemcarinata* Kroyer, Nat. Tidsskr., B. IV, p. 244, Tab. IV, Fig. 34–40, og Tab. V, Fig. 41–44.

! 1879. — — S. I. Smith, Trans. Conn. Acad., Vol. V, p. 57, Pl. XI, figs. 5 og 9–13.

Occurrence. The "Ingolf" has not taken this species.

In the waters on the west coast of Greenland this species goes as far up as Discovery Bay at Grinnell Land,  $81^{\circ} 44' \text{ N. L.}$ , 25 fm. (Miers); on the tract from  $79^{\circ} \frac{2}{3}'$  to  $72^{\circ} \text{ N. L.}$  it has been taken many times in 5–20 fm. and down to ca. 45 fm. (Miers, Hansen, Ortmann, Ohlin), and it is noted from 100 fm. in Melville Bay (Mc Clintock). On the west coast of Greenland it is rare south of  $72^{\circ} \text{ N. L.}$ : two specimens have been taken at Godhavn and Jakobshavn, several specimens in the stomachs of cod at Ivigtut.

It was taken in northern East Greenland by the 2<sup>nd</sup> Amdrup Exped. at 6 localities lying between  $69^{\circ} 44' \text{ N. L.}$  and  $74^{\circ} \frac{1}{2}' \text{ N. L.}$ , at one of these it was taken in the eel-seine in 7–0 fm.; on the East Greenland coast between  $70^{\circ} 27' \text{ N. L.}$  and  $74^{\circ} 35' \text{ N. L.}$  it has been taken a number of times by Swedish Zoologists, and the depth at one of these stations was ca. 160 fm. (Ohlin). — Near Jan Mayen one specimen was taken in 50–60 fm. (2<sup>nd</sup> Amdrup Exped.).

At Iceland it has been taken chiefly in the fjords along the east coast (Mid, Seydis, Nord, Rode, Faskrud and Beru Fjords), where *S. Sarsii* does not occur, at depths between 20 and 80 fm.;

on the north-west coast also it has been taken in Patriks Fjord and Arnar Fjord in 20 to 50 fm.; on the north coast several times in Skálfandi and once in 110 fm.

**Distribution.** Norman notes the species from the Shetland Isles, but it is not improbable that there was confusion with the later established *S. Sarsii*. In 1890 Sars writes that this species is found on the west coast of Norway, it occurs at Lofoten and according to his account must go much further south, though he does not mention the limit. It is also found on the western and eastern coasts of Finmark (Sparre-Schneider and Norman), in the whole of the Murman Sea and in the White Sea (Birula); further in the Barents Sea (Hoek, Stebbing), is frequent at Spitzbergen right up to  $81^{\circ} 14' \text{ N. L.}$  at all depths between 5–8 fm. and down to 133 fm. (Ohlin, Doflein, Birula); it is common in the Kara Sea in 10 to 100 fm. (Stuxberg, Hansen), has been taken in the Siberian Polar Sea at  $115\frac{1}{2}^{\circ} \text{ E. L.}$  and  $170^{\circ} 17' \text{ E. L.}$  (Stuxberg). On the east coast of North America it goes south to Massachusetts Bay, ca.  $42\frac{1}{3}^{\circ} \text{ N. L.}$ , and it has been taken at a number of localities from there to the St. Lawrence estuary in 15 and down to 70 fm. (Smith, M. Rathbun). It is not found in the Behring Straits and north of the American continent — i. e. between ca.  $180^{\circ}$  and  $80^{\circ} \text{ W. L.}$ . The species has been taken in 7–0 fm. and down to ca. 180 fm.; it is a pronouncedly arctic form.

**Remarks.** Ohlin (Bih. K. Sv. Vet. Akad. Handl. B. 27, Afd. IV, No. 8, p. 37) has already mentioned the superficial remark of Doflein's in "Fauna Arctica" that *Sab. Sarsii* is a variety of *S. septemcarinata*; Doflein has probably never seen *S. Sarsii*. Ohlin also mentions the *S. septemcarinata* described and figured by Bate in the "Challenger" Macrura; Bate says that his specimens agree most closely with Smith's *S. Sarsii*, which he considers as a "pronounced variety". This last opinion is incorrect; I have never seen any specimens which in regard to the form of the rostrum were intermediate between *S. Sarsii* and *S. septemcarinata*; also, there are very interesting differences in the geographical and bathymetrical distribution of the two species. The largest Icelandic specimen, a female with eggs, is from Beru Fjord and measures 76 mm.; from  $70^{\circ} 48' \text{ N. L.}$  comes the largest East Greenland specimen, likewise a female with eggs, 81.5 mm.; the largest specimen from the Kara Sea was 82.5 mm.

#### 46. *Pontophilus norvegicus* M. Sars.

1861. *Crangon norvegicus* M. Sars, Nyt Mag. f. Naturv., B. 11, p. 248.

! 1868. *Pontophilus* — M. Sars, Nyt Mag. f. Naturv., B. 15, p. 242, Tab. I, Fig. 1–25, Tab. II, Fig. 17–37.

**Occurrence.** The "Ingolf" has brought home this species from many stations:

Davis Straits: St. 32:  $66^{\circ} 35' \text{ N. L.}$ ,  $56^{\circ} 38' \text{ W. L.}$ , 318 fm., temp.  $3.9^{\circ}$ ; 20 spec.

— — — 35:  $65^{\circ} 16' — 55^{\circ} 05' — 362 — — 3.6^{\circ}$ ; 4 —<sup>1</sup>

— — — 28:  $65^{\circ} 14' — 55^{\circ} 42' — 420 — — 3.5^{\circ}$ ; 2 —

— — — 27:  $64^{\circ} 54' — 55^{\circ} 10' — 393 — — 3.8^{\circ}$ ; 50 —

— — — 25:  $63^{\circ} 30' — 54^{\circ} 25' — 582 — — 3.3^{\circ}$ ; 2 —

West of Iceland: St. 97:  $65^{\circ} 28' \text{ N. L.}$ ,  $27^{\circ} 39' \text{ W. L.}$ , 450 fm., temp.  $5.5^{\circ}$ ; 2 spec.

— — — 90:  $64^{\circ} 45' — 29^{\circ} 06' — 568 — — 4.4^{\circ}$ ; 1 —

<sup>1</sup> These two specimens possibly do not belong to this station but to St. 27.

West of Iceland: St. 89:  $64^{\circ} 45' \text{ N. L.}$ ,  $27^{\circ} 20' \text{ W. L.}$ , 310 fm., temp.  $8.4^{\circ}$ ; 1 spec.

— — — — 9:  $64^{\circ} 18' \text{ — } 27^{\circ} 00' \text{ — } 295 \text{ — } 5.8^{\circ}$ ; 7 —

South-West of Iceland: St. 81:  $61^{\circ} 44' \text{ N. L.}$ ,  $27^{\circ} 00' \text{ W. L.}$ , 485 fm., temp.  $6.1^{\circ}$ ; 5 spec.

— — — — 73:  $62^{\circ} 58' \text{ — } 23^{\circ} 28' \text{ — } 486 \text{ — } 5.5^{\circ}$ ; 2 —

South of Iceland: St. 69:  $62^{\circ} 40' \text{ N. L.}$ ,  $22^{\circ} 17' \text{ W. L.}$ , 589 fm., temp.  $3.9^{\circ}$ ; 1 spec.

From St. 101:  $66^{\circ} 23' \text{ N. L.}$ ,  $12^{\circ} 05' \text{ W. L.}$ , 537 fm., temp.  $\div 0.7^{\circ}$ , that is, east of northern Iceland in the cold area, a single specimen is to hand, but as it seems to have been dried, I can say with reasonable certainty that it has not been taken at the locality, with negative bottom-temperature, from which it is given.

It seems appropriate with this species to mention all its other localities within the seas mentioned.

Davis Straits:  $66^{\circ} 49' \text{ N. L.}$ ,  $56^{\circ} 28' \text{ W. L.}$ , 235 fm., temp.  $4.4^{\circ}$ , sand and mud, Wandel; 3 spec.

— —  $65^{\circ} 36' \text{ — } 56^{\circ} 24' \text{ — } 349 \text{ — } 3.2^{\circ}$ , clay and mud, — 1 —

— —  $65^{\circ} 35' \text{ — } 54^{\circ} 50' \text{ — } 80 \text{ — stones without algæ, Th. Holm; 2 spec.}$

South of Iceland:  $63^{\circ} 15' \text{ N. L.}$ ,  $22^{\circ} 23' \text{ W. L.}$ , 115—170 fm., "Thor" 1903; many spec.

— — —  $63^{\circ} 16' \text{ — } 19^{\circ} 57' \text{ — } 150\text{—}200 \text{ — } 1903$ ; several spec.

North-West of the Færoes:  $63^{\circ} 15' \text{ N. L.}$ ,  $9^{\circ} 35' \text{ W. L.}$ , 270 fm., Wandel; 1 spec.

South-West — —  $61^{\circ} 15' \text{ — } 9^{\circ} 35' \text{ — c. } 500 \text{ fm.}$ , "Thor" 1904; 7 spec.

— — —  $61^{\circ} 08' \text{ — } 9^{\circ} 28' \text{ — } 450 \text{ — } 1904$ ; 1 —

South-East — —  $61^{\circ} 22' \text{ — } 5^{\circ} 04' \text{ — } 255 \text{ — temp. } 0^{\circ}$ , ooze, Wandel; 1 spec.

Between the Færoes and the Hebrides:  $59^{\circ} 28' \text{ N. L.}$ ,  $8^{\circ} 1' \text{ W. L.}$ , 687—580 fm., "Michael Sars" 1902; 1 spec.

**Distribution.** This species has been taken at a number of places in the Skager Rak at a greater or less distance from the Skaw, in 55 to 275 fm. (material collected by Dr. Joh. Petersen), also at Bohuslän (Goës), in the deep fjords along the whole coast of Norway from Christiania Fjord to Varanger Fjord in depths from 30—60 fm. (M. Sars) to 672 fm. (G. O. Sars) and always in positive bottom-temperatures ( $2.8^{\circ}$ — $6.7^{\circ} \text{ C.}$ ), also off the west coast of Norway and north of this between  $72^{\circ}$  and  $73^{\circ} \text{ N. L.}$  ( $1.5^{\circ}$ — $6.9^{\circ}$ ), further, up towards Spitzbergen at  $75^{\circ} 58' \text{ N. L.}$ ,  $13^{\circ} 18' \text{ E. L.}$ , 186 fm., temp.  $2.7^{\circ}$  (Ohlin); lastly in the most westerly part of the Murman Sea, but not near to the White Sea (Birula). In the Bay of Gascony the species has been taken in 425 and 638 fm. (Caullery). Off the east coast of North America it goes from Cape Halifax (ca.  $44^{\circ} \text{ N. L.}$ ) to ca.  $38^{\circ} 37' \text{ N. L.}$  from 94 fm. and downwards to 524 fm. (S. I. Smith).

Both G. O. Sars and Ohlin consider it to be "in all probability" of arctic origin. Of this I know nothing, but it is certain that it is not an arctic form. Although it is usually met with in 200—500 fm., but can go in to 30—60 fm. and down to at least 672 fm., it has never been taken in negative bottom-temperatures; only once it is given from  $0^{\circ}$ , but the locality lies in the Færoe Channel where an error in the temperature may easily have arisen on account of the bottom, the temperature being taken at a place with  $0^{\circ}$  but the animal in reality at some distance at a place with positive temperature. The lowest certain observation among the numerous temperatures is  $1.5^{\circ}$ , but at most places it measured between  $3^{\circ}$  and  $7^{\circ}$ . The occurrence of this species up to almost  $76^{\circ} \text{ N. L.}$  and yet living everywhere in positive bottom-temperatures is interesting; with this its occurrence in the Bay of Gascony also agrees, the latter further showing sufficiently that the species is not arctic.

**47. *Pontophilus spinosus* Leach.**

1815. *Crangon spinosus* Leach, Trans. Linn. Soc. London, Vol. XI, p. 346.

1853. — — Bell, Brit. Stalk-eyed Crust. p. 261 (with figures).

1866. — — Heller, Crust. Südl. Europa, p. 229, Taf. VII, Fig. 16.

! 1868. *Pontophilus spinosus* M. Sars, Nyt Mag. f. Naturv. B. 15, p. 24, Tab. 2, Fig. 38—45, Tab. 3, Fig. 46, 47.

Occurrence. The "Ingolf" has not found this species. But in 1903 and 1904 two specimens in all were taken south of the south-west part of Iceland:

63° 15' N. L., 22° 23' W. L., 114—173 fm.; 1 spec.

West of Geirfugleskjær; young-fish trawl, 100 m. wire out; 1 extremely small spec., taken pelagically.

Distribution. The species, which is not known from the Færoes, is common at the Shetland Isles (Norman), is also found at the Hebrides (Norman) and further to the south on the coasts of Great Britain and Ireland, at the Channel Islands (Norman), it is also taken in the Bay of Gascony, 220 fm. (Caullery), and at a number of places spread over almost the whole of the Mediterranean, in depths from ca. 50 to 830 fm. (several authors). In Denmark it has been taken in the eastern Kattegat at depths from 22 to 55 fm. (Meinert), also at Bohuslän (Goës); along the south and west coasts of Norway from Christiania to Christiaussund in 30—60 fm. (M. Sars).

**48. *Glyphocrangon sculptus* Smith.**

! 1882. *Rhachocaris sculpta* S. I. Smith, Bull. Mus. Comp. Zool., Vol. X, p. 49, Pl. V, fig. 3, Pl. VI, figs. 3—3d.

1884. *Glyphocrangon sculptus* S. I. Smith, Rep. Comm. Fish and Fisher. f. 1882, p. 364.

1886. — — S. I. Smith, Rep. Comm. Fish and Fisher. f. 1885, p. 655, Pl. IX, figs. 1—2.

Occurrence. The "Ingolf" has taken this species at a single station.

West of Iceland, in the middle of the Denmark Straits: St. 11: 64° 34' N. L., 31° 12' W. L., 1300 fm., temp. 16°; 1 spec.

Distribution. The species has hitherto only been known from some stations off the east coast of North America between 41° 10' N. L. and 37° 50' N. L., in depths from 1098 to 1395 fm. (S. I. Smith); quite recently it is noted from South Africa, not far from Cape Point, 750—800 fm. (Stebbing).

Remarks. The single specimen, a female, is 100 mm. long.

**49. *Hippolyte varians* Leach.**

1815. *Hippolyte varians* Leach, Malac. Pod. Brit., Pl. 38, figs. 6—16.

! 1842. — smaragdina Krøyer, Kgl. D. Vid. Selsk. math.-naturv. Afh., Niende Deel, p. 271, Tab. I, Fig. 1—11.

1853. — varians Bell, Brit. Stalk-eyed Crust., p. 286, with figs.

! 1863. — — Heller, Crust. südl. Eur., p. 288, Taf. X, Fig. 4.

Occurrence. This species has not been brought home by the "Ingolf". It has been taken several times at the Færoes, thus at Thorshavn, Tværaa, Vestmannhavn, in Trangisvaag, 1—3 fm. and in Ande Fjord, 16—24 fm.

**Distribution.** The species is known from the Shetland Isles and the Hebrides (Norman); it is common at Great Britain and Ireland (various authors), it is also found at the Channel Islands (Norman), on the west coast of France (Bonnier), in the western part of the Mediterranean and in the Adriatic (Heller). It also occurs at Holland (Hoek); it goes far into the Kattegat, a little into the Sound (Meinert) and is found at Bohuslän (Goës). Concerning *H. fasciger* Gosse, which is identical with *H. varians*, Sars writes: "it occurs along the whole of our south and west coasts, but does not seem to reach up into the arctic region"; Sp. Schneider does not give *H. varians* from the fjords investigated by him lying between  $69\frac{1}{2}^{\circ}$  and  $70^{\circ}$  N. L.

The species lives in depths from quite a few fathoms out to ca. 50 fm.

#### 50. *Spirontocaris Fabricii* Kr.

1841. Hippolyte Fabricii Kroyer, Nat. Tidsskr., 3. B., p. 571.

! 1842. — — Kroyer, Kgl. D. Vid. Selsk. math.-naturv. Afh., Niende Deel, p. 277, Tab. I, Fig. 12—20.

1879. — — S. I. Smith, Trans. Conn. Acad., Vol. V, p. 63.

1891. Helia fabricii J. Thallwitz, Decapoden-Studien, p. 24.

**Occurrence.** The "Ingolf" has taken this species at the following place:

West Greenland: Ameragdlia (Head of Ameralik Fjord, Godthaab); 1 spec.

In Malac. Groenl. I mentioned a large number of localities for this species from West Greenland between  $72^{\circ} 23' \text{ N. L.}$  and  $60^{\circ} 43' \text{ N. L.}$ ; it is common from 2—5 fm. and out in ca. 45 fm.; once it was taken in 65 fm., while a note of its occurrence in 100 fm. (at Sukkertoppen) must be considered provisionally as doubtful. Since 1888 the Zoological Museum has received numerous specimens from the same coast but none of the localities offer any interest. — At East Greenland the species seems to be absent; in the Zoological Museum there is a specimen determined by Kroyer labelled "Iceland", but as Kroyer does not mention the locality and the animal has not been found at the island in the last 40 years I am inclined to think that this statement has arisen from some error.

**Distribution.** It has been taken at  $64^{\circ} 56' \text{ N. L.}$ ,  $66^{\circ} 18' \text{ W. L.}$ , 5—15 fm., a place which lies on the west side of the Davis Straits (Ohlin). It is also given from Labrador, St. Lawrence estuary and along the east coast of America southwards to Cape Cod; the species is common along the tract from Halifax southwards in depths from ca. 5 to 64 fm. (S. I. Smith). Further, it has been taken at Point Franklin on the north-west side of Alaska (Murdoch), and from there southwards "through Bering Sea to Siberia and Alaska Peninsula", "low water to 80 fathoms" (Mary Rathbun), also at Kamtschatka (Richters).

#### 51. *Spirontocaris Gaimardii* H. M.-Edw.

1837. Hippolyte Gaimardii H. Milne-Edwards, Hist. Nat. Crust., T. II, p. 378.

! 1842. — — Kroyer, Kgl. D. Vid. Selsk. math.-naturv. Afh., Niende Del, p. 282, Tab. I, Fig. 21—29.

1842. — gibba, Kroyer, l. c. p. 288, Tab. I, Fig. 30, og Tab. II, Fig. 31—37.

1891. Euales obses J. Thallwitz, Decapoden-Studien, p. 23.

Occurrence. The "Ingolf" has only met with this common species at a single station.

Baffin Bay: St. 33: 67° 57' N. L., 55° 30' W. L., 35 fm., temp. 0.8°; 18 spec.

In Malac. Groenl. I have mentioned numerous localities; the furthest north the species has been taken was at Grinnell Land at 79° 29' N. L. (Miers), and along the west coast of Greenland it goes from Port Foulke (Stimpson) to 61° 50' N. L.; of the bathymetric distribution I wrote: "This species is found generally in shallow water from ca. 4 fm. and out to 40 fm., but it has also been taken many times at a considerable depth, between 100 and 175 fm.; the observations from 240 and 250 fm. require further confirmation". Later finds, even those of Ortmann and Ohlin from the same region, have added nothing new worth mentioning to my earlier statements.

On the east side of Greenland the species has been taken at Angmagsalik (ca. 65½° N. L.), 9—0 fm., in the eel-seine, half a score of specimens (Amdrup Exp.), also a number of times by Swedish expeditions on the tract from 70° 27' N. L. to 74° 35' N. L., in depths from 6½—9 fm. and down to 132 fm. (Ohlin). At Jan Mayen, from which Koelbel had already noted it, two specimens were taken at 55 fm. (2<sup>nd</sup> Amdrup Exp.). At Iceland it has been taken a number of times along the whole of the west side, in almost all the fjords of the east coast and in Skagestrand Bay on the north coast, the depths being 0—2 fm. and out to 50 fm.; at the Færoes it has been taken at various places in a few fathoms water (Trangisvaag, Tveraa, Kolle Fjord, Vaag Fjord, Kvannesund, Skaale Fjord).

Distribution. The species occurs at the Shetlands and the Hebrides (Norman), on the west coast of Scotland at 56° N. L. (Bell) and in the Firth of Forth (Th. Scott). It is common in the Kattegat in ca. 2—12 fm., penetrates to the Sound and through the Belts into Kiel Bay and adjacent waters (Meinert, Möbius). It is found at Bohuslän (Goës), along the whole coast of Norway (M. Sars), on the coast of the Murman Sea and in the White Sea (Birula), in the Barents Sea (Hoek), at Spitzbergen (Krøyer, G. O. Sars etc.) and Franz Joseph Land (Scott), in the Kara Sea in 10—100 fm. (Hansen) and at the north-west corner of Asia. On the east coast of America it goes as far south as Boston, from there northwards it is found along the coast and is common at Labrador (S. I. Smith). It has been taken on the north side of Alaska at Point Franklin (Murdoch); also in Bering Straits and the Bering Sea both on the north east coast of Siberia and along the west coast of America southwards to 57° N. L., 3½ to 52 fm. (Mary Rathbun). Specimens from more southerly localities on the west coast of America were in 1904 referred by Mary Rathbun to new species.

The above data will have shown the main points in the bathymetric distribution of the species; it is commonest from some few to ca. 50 fm., has been taken several times at 100 to 175 fm., but how far the statements of 240 and 250 fm. at West Greenland are correct must remain unsettled. We see from its distribution that it occurs in both positive and negative bottom-temperatures.

Remarks. Almost all authors have united *S. gibba* Kr. with *S. Gaimardii*; most have considered that *S. gibba* was the male, which at certain places or in certain seas obtains the well-known dorsal process on the third abdominal segment. All the specimens of my large material from Denmark, the Færoes and Iceland quite lack the dorsal spine, and are thus typical *S. Gaimardii*. From Angmagsalik in East Greenland I have several large females, all typical *S. Gaimardii*, and 3 much smaller males, all typical *S. gibba*. From most of the localities of West Greenland the specimens of both sexes belonged to *S. Gaimardii*; in Malac. Groenl. I mentioned I had seen some very large

specimens with the dorsal spine, and they all came from 100 to 175 fm. depth in Baffin Bay. Later I have seen several specimens both males and females taken at Egedesminde, which belong to *S. gibba*; one of these was a gigantic female 80.5 mm. long, the abdominal process in which is a thick, pointed, slightly crooked spine. Concerning the numerous specimens from the Kara Sea I wrote in "Dijmphna-Togtet", p. 238: "Practically all the specimens belong to the form *Hipp. gibba* Kr., yet the prominent thickening on the dorsal side of the 3<sup>rd</sup> abdominal segment is usually much stronger than in Kroyer's specimens and runs out in the females into a small, in the males into a very considerable hook. It may be remarked that some specimens of this species are obviously large, but that the strong development of the dorsal spine on the 3<sup>rd</sup> abdominal segment is throughout much more characteristic for the representatives of this species from the Kara Sea than the absolute length of the animal". One of the largest females from the Kara Sea measures 74 mm., thus somewhat smaller than the giant from Egedesminde, and the dorsal spine in the latter is equal in size to the largest in the females from the Kara Sea, whereas the dorsal spine in males from the Kara Sea is longer, more slender and more bent than in any specimen from Greenland, though a male from 118 fm. at West Greenland is considerably larger than the same sex from the Kara Sea. Vanhöffen however states that he has had a female with eggs taken in Karajok Fjord which was 103 mm. (he gives lower down 108 mm.) in length.

## 52. *Spirontocaris spinus* Sow.

1806. *Cancer spinus* Sowerby, Brit. Miscellany, p. 47, Pl. XXIII.

! 1842. Hippolyte Sowerbei, Kroyer, Kgl. D. Vid. Selsk. math.-naturv. Afh., Niende Del, p. 298, Tab. II, Fig. 45—54.

1882. — *spinus*, Hoek, Nied. Arch. f. Zool., Supplb. I, Crustaceen, p. 15, Taf. I, Fig. 4—7.

! 1899. — — Birula, Ann. Mus. Zool. de l'Acad. Imp. St-Petersbourg, 1899, I, p. 30, Fig. 1.

Occurrence. The "Ingolf" has taken this species at 5 localities:

Baffin Bay: St. 33: 67° 57' N. L., 55° 30' W. L., 35 fm., temp. 0.8°; 42 spec.

Davis Straits: - 29: 65° 34' — 54° 31' — 68 — — 0.2°; 4 —

— — - 34: 65° 17' — 54° 17' — 55 — — ?; 15 spec.

North-West coast of Iceland: Dyre Fjord, 1 spec.

North of Iceland: St. 127: 66° 33' N. L., 20° 05' W. L., 44 fm., temp. 5.6°; 6 spec.

In Malac. Groenl. I have given a large number of localities for it; the most northerly is 81° 44' N. L. on Grinnell Land, also along Greenland itself from Cape York to 60° 43' N. L.; concerning the depth I wrote: "it is not rarely found in shallow water from ca. 4 fm. and outwards, is common and well-developed in 20—50 fm., and has been taken not a few times at a considerable depth, from 80 to 140 fm., but the statements of 200 to 240 fm. require further confirmation". Later observations have not extended this knowledge; Ohlin and Ortmann show, that the species is common between 76° and 79° N. L. in 5 to 45 fm. — At East Greenland one specimen was taken at Angmagsalik (Kruuse and 1<sup>st</sup> Amdrup Exp.), and it is given from more to the north on this coast, viz. 72° 45' N. L. and 74½° N. L., in respectively 18—32 fm. and 42—53 fm. (Ohlin). It has been taken at Jan Mayen in ca. 53 fm. (Koelbel).



At Iceland this species has several times been taken on the west side, from Arnarnæs to Reykjavik and Skagi; on the east side it has been found in Mid Fjord, Røde Fjord and Beru Fjord; the depths were from 3 to 52 fm. At the Færoes it has been taken at Thorshavn and several times further out to sea in 30, 60 and 100 fm. (Th. Mortensen).

**Distribution.** It has been found at Oban, west coast of Scotland, at  $56\frac{1}{2}$ ° N. L. (Norman), and is mentioned from the Irish Sea (Walker)<sup>1</sup>; a single specimen has been taken in the innermost part of the Kattegat at Samsø (Meinert); Goës gives it from Bohuslän, and Appellöf states that he has seen a typical specimen in the Kristineberg collection. In Norway it goes southward at least to ca.  $59\frac{2}{3}$ ° N. L., 30–40 fm. (G. O. Sars); and has been taken at Bergen and Christianssund only "at great depths" (Danielssen); it is known from the fjords near Tromsø (Sp. Schneider), but not from East Finmark (Norman), it occurs through the whole of the Murman Sea — is commonest here according to Birula in 40–50 fm., but is found in 4 and down to 175 fm. — and penetrates into the White Sea. It has several times been taken in the Barents Sea in 67 to 124 fm. (Hoek, Stebbing), is common at Spitzbergen (several authors), but on the other hand it has not been taken near Franz Joseph Land, in the Kara Sea nor along the whole of the north coast of Asia. On the east coast of North America it has frequently been taken on the tract from Cape Cod to off Nova Scotia, in depths from 5 to 90 fm. (S. I. Smith, M. Rathbun); it is likewise found in the St. Lawrence estuary (Whiteaves), at Labrador (Packard), on the north side of Alaska, in Bering Straits, the Bering Sea, at the Alaskan Peninsula and at the Aleutian Islands, in 5–91 fm. (Mary Rathbun), at Kamtschatka (Richters), lastly at Queen Charlotte Islands and Vancouver, 50° N. L. (Smith). — How far the species is found on the long tract of 130 degrees along the north coast of Asia is not yet known. The greatest depth from which it is known with certainty is 175 fm., the notices from 200 and 240 fm. I cannot consider absolutely trustworthy. It has been taken in so low a bottom-temperature as  $\div 1.42^{\circ}$  (Ohlin), but it also occurs on grounds with low positive temperatures.

**Remarks.** I have now come to the conclusion that the following species is not a variety of *S. spinus*. The differences will be dealt with under *S. Lilljeborgii*.

### 53. *Spirontocaris Lilljeborgii* Danielssen.

1859. Hippolyte Lilljeborgii Danielssen, Nyt Magazin for Naturvid. 1861, p. 5 (The title-page of the reprint bears the date of 1859).  
 1861. — securifrons, Norman, Rep. Brit. Assoc. f. Advanc. Sc. .  
 1863. — — Norman, Transact. Tyneside Naturalist's Field Club, 1860–62, Vol. V, p. 267, Pl. XI, figs. 1–2.  
 1873. — Lilljeborgii, Danielssen og A. Boeck, Nyt Mag. for Naturvid. 1873, p. 196, Tab., Fig. 15–20.  
 1899. — securifrons, Birula, Ann. Mus. Zool. de l'Acad. Imp. St.-Pétersbourg, 1899, I, p. 31, Fig. 2.

**Occurrence.** The "Ingolf" has brought home this species from two stations:

Davis Straits: St. 31: 66° 35' N. L., 55° 54' W. L., 88 fm., temp. 1.6°; 6 spec.

North-West of Iceland: St. 129: 66° 35' N. L., 23° 47' W. L., 117 fm., temp. 6.5°; 11 spec.

<sup>1</sup> I agree with Appellöf in his suggestion that Walker probably referred a specimen of *S. Lilljeborgii* to *S. spinus*, consequently that *S. spinus* has not been found in the Irish Sea.

I had noted it previously from the Davis Straits:  $66^{\circ} 32' N. L.$ ,  $55^{\circ} 34' W. L.$ , 100 fm., Th. Holm. It was taken by the "Thor" to the south of Iceland at the following localities:

$63^{\circ} 46' N. L.$ ,  $22^{\circ} 56' W. L.$ , 80 fm.; large number of specimens.

$63^{\circ} 15' — 22^{\circ} 23' — 114–173$  fm.; 1 specimen.

It has not been found at the Færoes.

**Distribution.** The species is noted by Norman from the Shetlands, Hebrides, Northumberland and Durham, from Firth of Clyde by Henderson; at Denmark it has twice been taken in the Kattegat in 5 fm. and 23 fm. (given by Meinert as *H. spinus*) and has been found a number of times in the Skager Rak in depths from 23 to 106 fm. According to G. O. Sars it is "very common on our (Norway) south and west coasts in great depths"; he gives it also from two places in the sea west of Finmark at 107 and 300 fm.; it is further found at East Finmark (Norman) and in the most westerly part of the south coast of the Murman Sea, in 94 to 159 fm. (Birula). Lastly, the species has been taken a number of times on the east coast of North America from Nova Scotia to  $37^{\circ} N. L.$ , in 25 to 640 fm. (S. I. Smith, Mary Rathbun), also on the north side of Alaska at ca.  $157\frac{3}{4} W. L.$  (M. Rathbun).

**Remarks.** In 1863 Norman gave a detailed description with 7 figures of this species. He concludes with the following words, which are cited here as the original description is rare in libraries: "*H. securifrons* approaches more nearly to *H. spinus* (Sowerby) than to any other of our recognised species. The latter may be more especially distinguished from the former; first, in having the dentated keel continued to the hinder margin of the carapace; secondly, in the four posterior teeth being of considerably greater size than the teeth anterior to them; thirdly, in the fact that the teeth in the upper margin of the rostrum are themselves furnished with secondary teeth; and fourthly, in having the dorsal centre of the third abdominal segment produced into a conspicuous tooth-like process". Further, Birula has remarked that the thoracic legs are relatively longer in *S. Lilljeborgii* than in *S. spinus*, and if the two posterior pairs are compared in the two species the difference is fairly obvious. As I have seen no transitional forms, I consider *S. Lilljeborgii* to be a true, independent species, which further may be called boreal and not arctic; it is absent from all the coldest places where *S. spinus* occurs.

#### 54. *Spirontocaris macilentus* Kr.

1841. *Hippolyte macilentus* Krøyer, Nat. Tidsskr., 3. B., p. 574.

! 1842. — — Krøyer, Kgl. D. Vid. Selsk. math.-naturv. Afh., Niende Del, p. 305, Tab. II, Fig. 55—56.

1879. — — S. I. Smith, Trans. Conn. Acad., Vol. V., p. 71.

**Occurrence.** The "Ingolf" has not taken this species.

It is mentioned in Malac. Groenl. that I had up to that time only seen 6 specimens in all, all determined by Krøyer, but not his original specimens; when he wrote his monograph he had only one specimen from Fiskeræsset in south-western Greenland, and it must have been lost. Since 1887 the Copenhagen Museum has received 4 specimens, taken at Jakobshavn by Traustedt. Vauhoffen states that he has taken three specimens in Karajok Fjord (at ca.  $70^{\circ} 20' N. L.$ ), one of them from over 50 fm. — This species has not been found at East Greenland, Iceland, or the Færoes.

**Distribution.** The species has several times been taken at Halifax, Nova Scotia, 26 to 57 fm. (S. I. Smith), in the St. Lawrence estuary, 30 to 70 fm. (Whiteaves), at Labrador (Packard), lastly in the Bering Straits, the Bering Sea over towards America and at Kamtschatka and in the Sea of Ochotsk, 16 to 100 fm. (Mary Rathbun).

**Remarks.** Doflein in "Fauna Arctica" has placed *S. macilentæ* Kr. as a synonym to "*H. phippsi* Krøyer"; on the following page (p. 333) under *S. spinus* he writes however: "Betrachte ich aber das gesamte Material, so kan ich so viel Uebergänge zu *H. phippsi* feststellen, insbesondere zu den als *turgida* and *macilentæ* von Krøyer als besondere Arten beschriebenen Formen von *phippsi*, dass ich glaube, es handelt sich nur um eine Art, welche dem Prioritätsgesetze gemäss den Namen *H. spinus* Sow. tragen muss. Diese Annahme wird auch durch die ganz gleichartige Verbreitungsweise der fraglichen Species unterstützt". That *H. phippsi* Kr. was the male, *H. turgida* Kr. the female of the same species had been made out many years before Doflein's work, but when he wishes to include *H. turgida* Kr. and *H. macilentæ* Kr. under *H. spinus* Sow., that shows great lack of knowledge of his subject and great hardihood. And the support given by the "gleichartige Verbreitungsweise" to the view that there is here only a single species is indeed a broken reed, as the three species have a very different distribution: *S. macilentæ* is only known from West Greenland and the waters on each side of the most northerly parts of North America, whilst both the other species are found for example on the northern parts of Europe, further *S. turgida* is certainly more arctic in its distribution than *S. spinus*.

### 55. *Spirontocaris turgida* Kr.

1841. Hippolyte *turgida* Krøyer, Nat. Tidsskr., 3. B., p. 575.

— — *Phippsi* Krøyer, — — —

1842. — *turgida* Krøyer, Kgl. D. Vid. Selsk. math.-naturv. Afh., Niende Del, p. 308, Tab. II, Fig. 57—58, Tab. III, Fig. 59—63.

! — — *Phippsi* Krøyer, Kgl. D. Vid. Selsk. math.-naturv. Afh., Niende Del, p. 314, Tab. III, Fig. 64—68.

1879. — — S. I. Smith, Trans. Conn. Acad., Vol. V, p. 73.

**Occurrence.** The "Ingolf" has brought home this species from two localities.

Baffin Bay: St. 33: 67° 57' N. L., 55° 30' W. L., 35 fm., temp. 0.8°; 2 spec.

Davis Straits: The mouth of Ameralik Fjord at Godthaab, 5—70 fm.; 1 spec.

I have given in Malac. Groenl. a large number of localities for this species; the most northerly was at 81° 44' N. L. at Grinnell Land (Miers), also along Greenland itself from 78° 17' to 60° 43' N. L.; the species is stated to be common in from 2—4 fm. and out in ca. 25 fm., it was taken some few times in depths from ca. 50 to 60 fm., but two statements of its occurrence in 100 and 200 fms. at Sukkertoppen I considered "very doubtful", and I believe I am now able to say that 100 fm. is probably correct, 200 fm. certainly incorrect. Later discoveries have not extended this knowledge; Ohlin and Ortmann show that the species is common between 76° and 79° N. L. in 5 to 45 fm. — At East Greenland the species has been taken at Tasiusak, 65° 37' N. L., 37° 34' W. L., 5—19 fm. and in the eel-seine, 9—0 fm. (Amdrup Exp. and Kruuse), and at Hekla Harbour in Scoresby Sound, 70° 27' N. L.,

26° 12' W. L., 9—11 fm., 6 specimens (Ryder Exp.); Ohlin gives it from 70° 27' N. L., 22° 35' W. L. Buchholz notes it from several localities further north (Cape Wynn, Sabine Isl., Shannon Isl. and North Shannon Isl.), from ca. 74° to a little north of 75° N. L. in depths from 5 fm. to 30 fm. and "20—100" fm. It has not been met with at Iceland or the Færoes.

**Distribution.** In Norway according to G. O. Sars it is "only exceptionally" found south of the Polar Circle, but it is stated nevertheless that a single specimen has been taken at Bohuslän (Goës). It is common at Finmark (M. Sars), from there it goes along the whole coast of the Murman Sea, into the White Sea and is said to have been taken in 145 fm. (Birula); it is also found in the Kara Sea at Nova Zembla (Hansen), at ca. 76 $\frac{1}{4}$ ° N. L., 59° E. L., 16 fm. (Heller), Franz Joseph Land (Scott), and Spitzbergen (several authors). On the east coast of North America it goes south to 41° 30' N. L., that is, a little to the south of Cape Cod; from here northwards to the St. Lawrence estuary it has been taken in depths from ca. 10 fm. and down to 125 fm. (S. I. Smith); it also occurs at Labrador (Packard jun.), on the north side of Alaska at Point Franklin, 13 $\frac{1}{2}$  fm. (Murdoch), the Bering Straits, west side of Alaska to Shumagin, also at the Aleutian Isl. (Mary Rathbun), Queen Charlotte Islands, 15—8 fm. (S. I. Smith), northern Japan at Hakodate (Stimpson), Sea of Ochotsk (Brandt), and the most easterly part of the north coast of Asia (Stuxberg).

#### 56. *Spirontocaris pusiola* Kr.

1841. *Hippolyte pusiola* Krøyer, Naturh. Tidsskr., 3. B., p. 576.

! 1842. — — Krøyer, Kgl. D. Vid. Selsk. math.-naturv. Afh., Niende Del, p. 319, Tab. III, Fig. 69—75.

1879. — — S. I. Smith, Trans. Conn. Acad., Vol. V, p. 77.

**Occurrence.** The "Ingolf" has brought this species home from two localities:

West side of Iceland: St. 87: 65° 02' N. L., 23° 56' W. L. 110 fm., temp. ?; 2 spec.

North of Iceland: St. 127: 66° 33' N. L., 20° 05' W. L., 44 fm., temp. 56°; 3 spec.

This small characteristic species is not found at West or East Greenland. At Iceland it has been taken on all four sides of the Island (Vestmannaöer, Reykjavik, Faxa Fjord, Dyre Fjord, Skagestrand Bay, Öfjord, Skjálfandi, Finne Fjord, Seydis Fjord, Faskrud Fjord), in depths from 6 to 119 fm.; it is common at the Færoes (Trangisvaag, Ande Fjord, Kalbak Fjord, Thorshavn and further from land) in ca. 8 to 100 fm.

**Distribution.** It occurs from the Shetlands and Hebrides (Norman), to Northumberland (Norman) and Norfolk (Metzger), the Irish Sea (Walker), at Jersey (Norman) and west coast of Holland (Metzger). In Denmark the species has been taken in the Great Belt, 24 fm., (Metzger), southern Kattegat (Meinert), Skagerak (Metzger); also at Bohuslän (Goës), along the coast of Norway (M. Sars), at East Finmark (Norman), on the western part of the Murman coast to the entrance to the White Sea (Birula, Doflein), lastly on the west side of Spitzbergen at 77° 23 $\frac{1}{2}$ ' N. L., 24° 07' E. L. in 40 fm. (Doflein). On the east coast of America it begins somewhat south of Cape Cod at ca. 41° 10' N. L. and goes northwards to Nova Scotia and the estuary of St. Lawrence; it is found from 4 fm. or even at the ebb margin out to 50 fm. and 52—90 fm. (Smith). Further, it has been taken at numerous localities in the Bering Islands, the Aleutians and Alaskan peninsula -- i. e. along the south boundary

of the Bering Sea — in depths of 5 to 159 fm. (Mary Rathbun). — The greatest depth at which the species seems to have been taken in Europe is 119 fm. in Skagestrand Bay in Iceland; south of the Alaskan peninsula it was taken in 159 fm.

### 57. *Spirontocaris polaris* Sab.<sup>1</sup>

1824. *Alpheus polaris* Sabine, Suppl. to the App. of Capt. Parry's Voy., p. CCXXXVIII, Pl. II, figs. 5—8.

! 1842. *Hippolyte polaris* Kroyer, Kgl. D. Vid. Selsk. math.-naturv. Aftn., Niende Del, p. 324, Tab. III, Fig. 78—81, Tab. IV, Fig. 82.

! — — *borealis* Kroyer l. c. p. 330, Tab. III, Fig. 74—77.

1879. — *polaris* S. I. Smith, Trans. Conn. Acad., Vol. V, p. 80.

1886. — Amazo Pfeffer, Jahrb. wiss. Anst. Hamburg, III, p. 46, Fig. 6 a, 6 b.

Occurrence. The "Ingolf" has taken this species at 12 localities:

Baffin Bay: St. 33: 67° 57' N. L., 55° 30' W. L., 35 fm., temp. 0°8'; 4 spec.

Davis Straits: St. 31: 66° 35' N. L., 55° 54' W. L., 88 fm., temp. 1°6'; 3 spec.

— — - 32: 66° 35' — 56° 38' — 318 — — 3°9'; 1 —

— — - 29: 65° 34' — 54° 31' — 68 — — 0°2'; 13

— — - 34: 65° 17' — 54° 17' — 55 — — ?; 17 spec.

East of South Greenland: St. 94: 64° 56' N. L., 36° 19' W. L., 204 fm., temp. 4°1'; 1 spec.

South-West of Iceland: St. 85: 63° 21' N. L., 25° 21' W. L., 170 fm., temp. ?; 1 spec.

North of East Iceland: - 126: 67° 19' — 15° 52' — 293 — — ÷ 0°5'; 1 spec.

South of Jan Mayen: - 116: 70° 05' — 8° 26' — 371 — — ÷ 0°4'; 10 —

East of Iceland: St. 59: 65° 00' N. L., 11° 16' W. L., 310 fm., temp. ÷ 0°1'; 1 spec.

North-West of the Faeroes: St. 138: 63° 26' N. L., 7° 56' W. L., 471 fm., temp. ÷ 0°6'; 1 spec.

— — — - 1: 62° 30' — 8° 21' — 132 — — 7°2'; 4 —

In Malac. Groenl. I have given a large number of localities for this species, the most northerly at 81° 44' N. L. in Grinnell Land (Miers), also along Greenland itself from ca. 78<sup>1</sup>/<sub>3</sub>° N. L. to 60° 43' N. L.; it was taken in 2—3 fm., often in 10 to 20 fm., common in 40 to 100 fm., and was several times found in 118 to 260 fm. Later discoveries in these regions have not appreciably extended our knowledge; it is said by Ohlin and Ortmann that the species is common between 76° and 79° N. L. in 5 to 40 fm. Ohlin gives it also from the west side of Baffin Bay and Pfeffer had his *H. amazo* from the west side of the Davis Straits. — At East Greenland the species is common at Tasiusak, ca. 65° 37' N. L. (Kruuse, Ryder Exp. and Amdrup Exp.); on the tract from ca. 69<sup>1</sup>/<sub>2</sub>° N. L. to 74<sup>1</sup>/<sub>2</sub>° N. L. it has been taken half a score of times (by the 2<sup>nd</sup> Amdrup Exp.), in 3—0 fm., 10 fm., 20 fm., 50 fm., 94 fm., 110 fm. and 120 fm.; in Hekla Harbour at 70° 27' N. L., 26° 12' W. L. it was taken in 1 to 11 fm. (Ryder); and it is noted by Ohlin and Buchholz from numerous localities between 71° 35' N. L. and 74° 52' N. L., in depths from 2 fm. and down to 186 fm.; lastly it has been taken even a little further north at Shannon Isl.

<sup>1</sup> In the list of synonyms to this species I have not included *S. incerta* Buchholz which was founded on a single specimen from East Greenland (Zweite Deutsche Nordpolarfahrt, B. II, p. 272). The reason is that though I consider it to have been founded on a specimen of *S. polaris* (Buchholz states however that an epipodite only occurs on the first and second pairs of thoracic legs), I am not certain of my interpretation and as I did not wish to omit mentioning a species noted from East Greenland I have preferred to mention it here in a footnote.

(Buchholz). At Jan Mayen it has been taken in 16—122 fm. (Koelbel). — At Iceland it has been found in the fjords of the west coast (Önundar Fjord), north coast (Öfjord) and east coast (Faskrud Fjord) in 4 to 10 fm.; off the coast it has been taken by the "Thor" at the following places:

East of North Iceland: 66° 02' N. L., 11° 05' W. L., 478—553 fm.

South of Iceland: 63° 15' N. L., 22° 23' W. L., 115—173 fm.

At the Færoes it is not common; I have only seen a few specimens from respectively Thors-havn and Sandvaag on Vaag Island.

**Distribution.** This species has been taken at the Shetlands and Hebrides (Norman). It also occurs at Bohuslän (Goës), in the Skager Rak (Intern. Explor.), on the south, west and north coasts of Norway (M. Sars, Appellöf), along the whole coast of the Murman Sea and in the White Sea (Birula), at Franz Joseph Land (Heller and Scott), in the Barents Sea, in depths from 37 to 192 fm. (Hoek); it is common round about Spitzbergen (G. O. Sars, Doflein) and it has been taken west of this in 459 fm. (G. O. Sars). It is also common in the Kara Sea, 46—91 fm. (Hansen), but is unknown further to the east along the north coast of Asia. On the east coast of North America it goes as far south as 41° 34½' N. L.; from there and to Halifax in Nova Scotia it has been taken a number of times in 10—15 fm. and down to 306 fm. (Smith); it is also known from the St. Lawrence estuary (Whiteaves) and at Labrador (Smith). Lastly, it is noted from the waters north of Bering Straits (Stimpson), also in the Bering Sea, Sea of Ochotsk and at the Aleutians "eastward to Kadiak, to a depth of 283 fathoms" (Mary Rathbun). — *H. polaris* is thus an arctic species, which extends deeply into the boreal region and is found both in positive and negative bottom-temperatures. It is taken at all depths from 3—0 fm. and down to 478—553 fm. ("Thor").

**Remarks.** The species attains a larger size in depths of ca. 50 fm. and more than in shallower water; as was to be expected the shallow-water specimens which live at East Greenland are on the whole larger than those at West Greenland. Amongst the specimens from the "Ingolf" St. 116 are some which are very large; one ♀ is 81.5 mm., a male 73.5 mm. long; the largest specimen I have seen, a ♀ 84 mm. long, was taken at 69° 40' N. L., 23½° W. L., 120 fm., but Vanhöffen states that he has had a specimen of 88 mm. in length from Karajok Fjord (ca. 70° 20' N. L.); Ohlin states that he has seen a specimen 89 mm. long from East Greenland. In 1895 I wrote that some females with eggs were taken by the Ryder Expedition to East Greenland on the following dates: August 1891, 13<sup>th</sup> Dec. 1891, 10<sup>th</sup> Jan. 1892, 8<sup>th</sup> Febr. and 27<sup>th</sup> April 1892; from these we may conclude that the species at least at this very cold locality (Hekla Harbour) has no definite spawning period, but seems to be able to spawn throughout the whole or almost the whole year.

### 58. *Spirontocaris groenlandica* J. C. Fabr.

1775. *Astacus Groenlandicus* J. C. Fabricius, Syst. Entom. p. 416.

1780. *Cancer aculeatus* O. Fabricius, Fauna groenl. n. 217, p. 239.

1842. *Hippolyte aculeata* Kroyer, Kgl. D. Vid. Selsk. math.-naturv. Afh., Niende Del, p. 334, Tab. IV,

Fig. 83—98 og Tab. V, Fig. 99—104.

**Occurrence.** This species was only found once by the "Ingolf".

Baffin Bay: St. 33:  $67^{\circ} 57' N. L.$ ,  $55^{\circ} 30' W. L.$ , 35 fm., temp.  $0.8^{\circ}$ ; many spec.

In Malac. Groenl. I have mentioned a large number of localities from  $76^{\circ} 8' N. L.$  to  $60^{\circ} 8' N. L.$  along the west coast of Greenland, and it has been taken at Grinnell Land at  $82\frac{1}{2}^{\circ} N. L.$ ; concerning the depth I wrote that the species "is found very frequently in shallow water from about 5—10 fm., is common in 30—50 fm. and is noted several times from deep water, thus twice even from 200 fm." Later discoveries in these regions have not appreciably extended our knowledge; it is stated by Ohlin and Ortmann that the species is common between  $76^{\circ}$  and  $79^{\circ} N. L.$  in 5 to 40 fm. At East Greenland the species is common at Tasiusak,  $65^{\circ} 37' N. L.$  (Kruuse, 1<sup>st</sup> Amdrup Exp.); it was taken by the 2<sup>nd</sup> Amdrup Exp. at  $69^{\circ} 44' N. L.$ ,  $23\frac{1}{2}^{\circ} W. L.$  in the eel-seine, 3—0 fm., many specimens; at  $74^{\circ} 18' N. L.$ ,  $19^{\circ} 50' W. L.$ , 10 fm., 1 specimen and at  $74\frac{1}{2}^{\circ} N. L.$ ,  $18^{\circ} 45' W. L.$ , anchorage, several specimens; it has been taken many times on the tract  $72\frac{2}{3}^{\circ} N. L.$  to at least  $75^{\circ} N. L.$  according to Ohlin and Buchholz. — It has never been found at Jan Mayen, Iceland or the Færoes.

Distribution. G. O. Sars writes that the Christiania Museum contains two specimens which "from the label attached" were taken by Prof. Rasch at Christianssund. I have considerable doubts as to whether the two specimens really came from Christianssund, as this large and easily recognised species has not been taken in Europe either before or since. On the east coast of America it goes southward to ca.  $41\frac{1}{3}^{\circ} N. L.$ ; from here and as far as Halifax in Nova Scotia it has been taken repeatedly in 1—72 fm. (Smith, M. Rathbun); it has also been taken in the St. Lawrence estuary, at Labrador (Smith), and in Cumberland Sound on the west side of Davis Straits (Pfeffer). It has also been found in the waters north of the Bering Straits and in the Bering Sea (Owen, Stimpson); along the west coast of America at Queen Charlotte Islands (Smith) and in Puget Sound, ca.  $47^{\circ} N. L.$  (Calman); lastly at Kamtschatka and the Kurile Islands (Brandt).

After giving a correct account of the distribution of this species Doflein writes: "Die Art ist somit cirkumpolar". Excluding Christianssund which lies far south of the Polar Circle (and which as mentioned must be regarded as doubtful), the species is still unknown from Jan Mayen and along the north coasts of Europe and Asia to the Bering Sea, thus, over almost 200 of the 360 degrees of longitude! We cannot deny, that Dr. Doflein does not ask much of the distribution of a species whose circumpolarity he considers as proved.

Remarks. The largest specimen I have seen is 119 mm. long from the tip of the rostrum; it was taken at Akugdlek,  $68^{\circ} 40' N. L.$ , on the west coast of Greenland.

### 59. *Spirontocaris microceros* Kr.

1841. Hippolyte microceros Kroyer, Nat. Tidsskr., 3. B., p. 579.

! 1842. — — Kroyer, Kgl. D. Vid. Selsk. math.-naturv. Afl., Niende Del, p. 341, Tab. V,  
Fig. 105—109.

Occurrence. The "Ingolf" has not taken this species.

In Malac. Groenl. I have given the following localities: Proven (ca.  $72^{\circ} 23' N. L.$ ), Umanak, Ivigtut and Nanortalik (ca.  $60^{\circ} 8' N. L.$ ); the Copenhagen Museum also possesses some other West Greenland specimens, without special locality. The species has not been found at West Greenland

during the last twenty years or more; at East Greenland, Iceland and the Færoes it has never been found.

**Distribution.** This so easily recognised species has up to the present never been found elsewhere except at the West Greenland coast.

**Remarks.** One of the largest specimen, a female, is 54 mm. long.

Dr. Doflein writes: "Kroyer scheint nach meiner Ansicht diese Art auf ein etwas abweichendes (verletztes und geheiltes?) Exemplar von *H. aculeata* begründet zu haben". The learned author's boldness is displayed on so many different questions that it is quite remarkable. It gives him no trouble to express an opinion in this way on *H. microceros*, founded by so excellent an observer as Kroyer, though he himself has never seen a specimen of the species, in which the abdomen lacks the very obvious spinous equipment which characterises *H. aculeata* from all other Greenland species, whilst according to Kroyer *H. aculeata* lacks but *H. microceros* has epipodites on the third pair of thoracic legs. Lastly, Dr. Doflein opines that Kroyer has founded *H. microceros* "auf ein... Exemplar", whereas Kroyer "has found some few specimens", and indeed in the Latin diagnosis speaks of "Antennæ...marium" in contrast to the antennæ "in feminis", and must therefore have seen more than one specimen. From this and several cases mentioned previously it appears, that the learned carcinologist Dr. Doflein requires even less for his reading of an author he quotes or whose judgment he controverts than he does for a species, e. g. *S. groenlandica*, to make it "somit cirkumpolar".

#### 60. *Bythocaris leucopis* G. O. Sars.

1879. *Bythocaris leucopis* G. O. Sars, Arch. f. Math. og Naturv., B. IV, p. 427.

! 1885. — — G. O. Sars, Den Norske Nordhavs-Exped., Crust. I, p. 27, Pl. III, Fig. 1—26.

**Occurrence.** The "Ingolf" has taken this species at 14 stations. These all lie in the Northern Ocean, within an area which is bounded to the east by a line from Jan Mayen to the Færoes and extends also so far to the west that it passes north round the north-eastern end of Iceland and from there southward round East Iceland to the Færoes. The stations are as follows:

St. 113:	69° 31' N. L.,	7° 06' W. L.,	1309 fm.,	temp. ÷ 10°;	1 small spec.
- 117:	69° 13'	8° 23'	1003 — —	÷ 10°;	9 spec.
- 118:	68° 27'	8° 20'	1060 — —	÷ 10°;	3 —
- 125:	68° 08'	16° 02'	729 — —	÷ 08°;	4 —
- 112:	67° 57'	6° 44'	1267 — —	÷ 11°;	2 —
- 119:	67° 53'	10° 19'	1010 — —	÷ 10°;	11 —
- 124:	67° 40'	15° 40'	495 — —	÷ 06°;	7 —
- 120:	67° 29'	11° 32'	885 — —	÷ 10°;	4 —
- 111:	67° 14'	8° 48'	860 — —	÷ 09°;	3 —
- 102:	66° 23'	10° 26'	750 — —	÷ 09°;	2 —
- 103:	66° 23'	8° 52'	579 — —	÷ 06°;	1 —
- 104:	66° 23'	7° 25'	957 — —	÷ 11°;	36 —
- 105:	65° 34'	7° 31'	762 — —	÷ 08°;	18 —
- 140:	63° 29'	6° 57'	780 — —	÷ 09°;	2 —



Further, two specimens were taken by the "Michael Sars" at  $63^{\circ} 3' \text{ N. L.}$ ,  $6^{\circ} 32' \text{ W. L.}$ , 975 fm., temp.  $\div 0.51^{\circ}$ .

**Distribution.** The species was founded on specimens from a station between Jan Mayen and Finmark, 1110 fm., temp.  $\div 1.3^{\circ}$ ; it was also taken in the stomach of *Rhodichthys regina* in the same waters in 1280 fm. (G. O. Sars). Ohlin gives it from three localities, one being between Greenland and Jan Mayen, depth 1064 fm., the second near the west coast of Spitzbergen:  $76^{\circ} 36' \text{ N. L.}$ ,  $12^{\circ} 10' \text{ E. L.}$ , 930 fm., temp.  $\div 1.3^{\circ}$ , the third almost midway between Spitzbergen and East Greenland:  $77^{\circ} 52' \text{ N. L.}$ ,  $3^{\circ} 5' \text{ W. L.}$ , 1462 fm., temp.  $\div 1.4^{\circ}$ . Birula mentions a single specimen from  $79^{\circ} 41' \text{ N. L.}$ ,  $4^{\circ} 58' \text{ E. L.}$ , 1560 fm., temp.  $\div 1.1^{\circ}$ . The species has thus been taken at depths from 495 fm. to about 1560 fm. with bottom-temperatures between  $\div 0.6^{\circ}$  and  $\div 1.4^{\circ}$  in the waters between the Færoes, Iceland, Norway, Spitzbergen and East Greenland with negative bottom-temperature at considerable depths.

**Remarks.** The largest specimens I have are females with eggs from St. 104, 117 and 118, and they measure 87–87.5 mm. From St. 119 there is a female with eggs 81 mm. long, from St. 105 a similar female 73.5 mm., from St. 125 and 140 two females with eggs 75 mm. long and from the last station a female with eggs only 69 mm. long. Sars gives the length "up to 95 mm."; I must suppose that he has measured from the tip of the rostrum (not, as suggested by Ohlin, from the end of the antennal scale) to the end of the telson. — The antennal scale varies a little in form with the size of the animal: its terminal margin is less oblique and scarcely so curved in the large specimens as in the small, and distally it is a trifle broader in the large than in the small specimens.

### 61. *Bythocaris Payeri* Hell.

1875. Hippolyte Payeri Heller<sup>1</sup>, Denksch. d. K. Akad. d. Wiss., Math.-naturv. Classe, B. 35, p. 26, Taf. I,

Fig. 1–4.

1882. *Bythocaris payeri* Hoek, Ned. Arch. f. Zool., Supplb. I, Crust. p. 19, Fig. 8–9.

! 1885. — Payeri G. O. Sars, Den norske Nordhavs-Exp., Crust. I, p. 33, Pl. III, Fig. 27.

**Occurrence.** The "Ingolf" has taken this species at 8 stations. Just as for the previous species, the stations lie in the Northern Ocean, within an area which to the east is bounded by a line from Jan Mayen to the Færoes and also extends so far to the west as to pass to the north round the north-eastern end of Iceland and southward round East Iceland down to the Færoes. The stations are as follows:

St. 116:  $70^{\circ} 05' \text{ N. L.}$ ,  $8^{\circ} 26' \text{ W. L.}$ , 371 fm., temp.  $\div 0.4^{\circ}$ ; great quantity of spec.

- 124:  $67^{\circ} 40' - 15^{\circ} 40' - 495 - - \div 0.6^{\circ}$ ; 13 spec.

- 126:  $67^{\circ} 19' - 15^{\circ} 52' - 293 - - \div 0.5^{\circ}$ ; 1 —

- 101:  $66^{\circ} 23' - 12^{\circ} 05' - 537 - - \div 0.7^{\circ}$ ; 3 —

- 103:  $66^{\circ} 23' - 8^{\circ} 52' - 579 - - \div 0.6^{\circ}$ ; 4 —

- 59:  $65^{\circ} 00' - 11^{\circ} 16' - 310 - - \div 0.1^{\circ}$ ; 1 —

- 139:  $63^{\circ} 36' - 7^{\circ} 30' - 702 - - \div 0.6^{\circ}$ ; 2 —

- 138:  $63^{\circ} 26' - 7^{\circ} 56' - 471 - - \div 0.6^{\circ}$ ; 13 —

<sup>1</sup> The same year the author had published a brief preliminary description without figures in Sitzb. K. Akad. Wissensch. I. Abth., April-Heft, Jahrg. 1875.

Further, the species has been taken at 66° 2' N. L., 11° 5' W. L., 552–478 fm. ("Thor" 1903). It has never been found at West Greenland; at East Greenland the species has been taken five times between 74° 52' N. L. and 72° 28' N. L., depths from 95 to 185 fm. (Ohlin). At Jan Mayen it has been taken in 678 fm. (Ohlin). South of the Færoes it has been found at 61° 23' N. L., 4° 21' W. L., 505 fm., temp.  $\div$  0.4°, 5 specimens (Wandel), and it is given from 60° 3' N. L., 5° 51' W. L., 540 fm. (Norman).

Distribution. The species was first taken at Franz Joseph Land, 97 fm. (Heller). It was taken by the Norwegian North-Atlantic Expedition at 9 stations with negative bottom-temperatures and all lying in the waters west of Norway and from there up to the west of Spitzbergen from 63° 17' N. L. to 79° 59' N. L. (G. O. Sars). The depths varied between 350 fm. and 1081 fm. It is also given from 78° 2' N. L., 9° 25' E. L., 416 fm., with a bottom-temperature of 0.8° (G. O. Sars), likewise from 79° 58' N. B., 9° 30' E. L., 224 fm. with a bottom-temperature of 1.5° (Ohlin), but both stations lie on the border of the cold area. Lastly, the species has been taken in the eastern part of Barents Sea: 75° 16' N. L., 45° 19' E. L., 160 fm. (Hoek).

It appears from the above that the species is found only at depths from ca. 100 fm. to 1080 fm. in the cold area from the Færoe Channel northwards to the northern part of East Greenland, Spitzbergen, Franz Joseph's Land and the Barents Sea; it has twice been taken in the neighbourhood of Spitzbergen near the boundary to the area mentioned, in temperatures a little above 0°.

Remarks. The species stands extremely near to *B. gracilis* Smith, as is mentioned below, where the differences between the two forms are also dealt with.

## 62. *Bythocaris gracilis* S. I. Smith.

1885. *Bythocaris gracilis* S. I. Smith, Proc. U. S. Nat. Mus., Vol. VII, p. 497.

1886. — — S. I. Smith, Rep. Comm. Fish and Fisheries for 1885, p. 658, Pl. XII, figs. 3, 4.

Occurrence. This species was taken by the "Ingolf" at three stations:

Davis Straits: St. 28: 65° 14' N. L., 55° 42' W. L., 420 fm., temp. 3.5°; 3 spec.

— — - 27: 64° 54' — 55° 10' — 393 — — 3.8°; 2 —

South of West Iceland: St. 67: 61° 30' N. L., 22° 30' W. L., 975 fm., temp. 3°; 1 spec.

Distribution. Previously, only two specimens in all were known from two localities east of North America, namely, about 39½° N. L. and 35¾° N. L. in 1043 fm. and 888 fm., temp. 38° and 39° Fahr.

Remarks. My specimens must be referred to *B. gracilis* Smith; but the following remarks have to be made. The median dorsal spine on the gastric region occurs in all specimens; in one of them it is certainly very small and it occurs in some specimens of *B. Payeri* from St. 116, so that its presence in *B. gracilis* is not a valuable character. The eyes in *B. gracilis* are but little larger than in *B. Payeri*; it is necessary however to carefully choose equally large specimens of both species for comparison. The best character between the two seems to be, that the antennal scale is somewhat narrower and a little longer in *B. gracilis*, but the difference is much smaller than is given in Smith's description, and in *B. Payeri* the scale becomes relatively a little broader with age. Smith's figure of *B. Payeri* was drawn from a specimen larger than the one which formed the subject for his figure

of *B. gracilis*, and it is therefore to a certain extent misleading. Further, there is also some difference in the form of the scale in my specimens of *B. gracilis*: in the specimen from St. 67 the part beyond the spine on the outer margin is more prolonged, the scale itself relatively longer and with almost parallel margins; the specimen thus differs in the form of the scale more from *B. Payeri* than is the case with the specimens from the Davis Straits, in which the margins of the scale diverge forwards. — The differences between *B. Payeri* and *B. gracilis* are thus very small, but as the differences exist the species should be maintained, at any rate until further knowledge of the variation and geographical distribution has been obtained.

### 63. *Bythocaris simplicirostris* G. O. Sars.

1870. *Bythocaris simplicirostris* G. O. Sars, Vid. Selsk. Forh. Christiania, f. 1869, p. 149.  
 1874. *Hippolyte Panschii* Buchholz, Zweite Deutsche Nordpolarfahrt, B. II, p. 277, Taf. I, Fig. 1.  
 1894. *Bythocaris simplicirostris* Norman, Ann. Mag. Nat. Hist., Ser. 6, Vol. XIII, p. 270, Pl. XII, fig. 1.  
 1897. — — Birula, L'Annuaire du Mus. Zool. de l'Acad. Imp. de St.-Pétersbourg, 1897, p. 427, Tab. XX, Fig. 3.  
 1901. — — Ohlin, Bih. till K. Svenska Vet.-Akad. Handl., B. 27, Afd. IX, no. 8, p. 39, Fig. 1.

Occurrence. The "Ingolf" has only taken this species at one station.

South-East of Iceland: St. 4: 64° 7' N. L., 11° 12' W. L., 237 fm., temp. 2.5°; 1 spec.

The species is described under the name *Hippolyte Panschii* by Buchholz from a specimen taken in 30 fm. at Nordshannon, which lies in ca. 75° N. L. on East Greenland; I have seen an East Greenland specimen from ca. 74½° N. L., near Pendulum Islands, 110 fm. (2nd Andrup Exped.), and a specimen was taken in 133 fm. a little more to the south, namely, off Kaiser Franz Joseph Fjord (Ohlin). Lastly, I have seen a specimen taken a little east of the south end of the Færoes: 61° 23' N. L., 5° 04' W. L., 255 fm., temp. 0° (Wandel).

Distribution. Sars founded *B. simplicirostris* (see Remarks) on a specimen taken at Skraaven (Lofoten) in 250 fm.; later, it was taken by the same author at 72° 27' N. L., 20° 51' E. L., 191 fm., temp. 3.5° and at 78° 2' N. L., 9° 25' E. L., 416 fm., temp. 0.8°; Metzger notes it from Mandal, 60 fm., Norman from Trondhjem Fjord, 250–300 fm., Nordgaard from Trano Deep, 322–340 fm., and from Malangen (ca. 69½° N. L.), ca. 50–100 fm. Lastly, it is given from the western part of the Murman Sea (Birula).

Remarks. I have referred my specimens to *B. simplicirostris* and included *B. Panschii* as a synonym. If the former is incorrect, I venture to think with a considerable degree of certainty, that Ohlin's specimen from East Greenland and G. O. Sars' specimens from ca. 72½° and 78° N. L. have also been incorrectly determined, as all these have undoubtedly belonged to *B. Panschii*. The question is therefore, whether this species is identical with *B. simplicirostris* or not. It cannot be settled with certainty from the available descriptions, but both the distribution and Sars' own reference of his specimens from the Norwegian North-Atlantic Expedition to the species from Lofoten speak strongly in favour of it. Sars certainly writes: "Oculi minimi subcylindrici, pigmento pallide fulvescente", and this seems to tell strongly against my determination (unfortunately, neither Sars nor Ohlin refer later

to the point), but Norman — who captured two specimens in the Trondhjem Fjord, says: "Eyes well developed, on long peduncles, when laterally projected extending beyond the sides of the carapace", and my three specimens show extremely peculiar differences with regard to the eyes. In the "Ingolf" specimen the one eye preserved is grey-brown, but it is black in the two other specimens; the specimens from East Greenland is a female with eggs, the eye-stalks are cylindrical in almost their whole length and scarcely thinner than the diameter of the eye; the latter in this specimen is not only relatively considerably smaller but almost absolutely smaller than in the two other considerably smaller specimens, but in both of these the eye itself is obviously broader than the stalk and the latter is strongly conical in the specimen from the Færoes. Whether all this variation indicates anything or not, in other words, whether there should be two (or three) species extremely closely related or only a single species, variable with respect to the eyes, neither my small and far from perfect material nor the literature can give any final decision. But I am greatly inclined to consider, that not only my own specimens but also those mentioned by earlier authors of *B. simplicirostris* and *B. Panschii* belong to the same species.

#### 64. *Caridion Gordoni* Bate.

? Hippolyte Gordoni Bate, Nat.-Hist. Review, V, p. 51 [test. Norman].

1861. *Doryphorus* — Norman, Ann. & Mag. Nat. Hist., Ser. 3, Vol. VIII, p. 277, Pl. XIII, figs. 6 & 7.

1863. *Caridion* — Goës, Öfv. K. Svenska Vet.-Akad. Förhandl., 20 Årg., p. 170.

Occurrence. This species has not been taken by the "Ingolf". It has only been found twice by the "Thor" within the area dealt with in this work.

South-West of Iceland: West of Geirfugleskær, many small spec. and larvæ.

South of West Iceland: 63° 15' N. L., 22° 23' W. L., 114—173 fm.; many spec.

Distribution. The species is known from the Shetlands and the Hebrides (Norman), Scotland (Norman), the Irish Sea (Walker), North Sea: 48 miles W. of Blaavandshuk, 22 fm. (Metzger); also from Bohuslän on the west coast of Sweden, 10—15 fm. (Goës); lastly, from several places on the south and west coast of Norway, especially in the region of the deep-sea corals, and Varanger Fjord on the east coast of Finnmark (G. O. Sars). When Sars writes on the basis of the last find: "it seems from this that the present form must be regarded as a northerly, perhaps even an arctic form", it must be said that its distribution shows that it is certainly not arctic. Further, it has also been taken at a number of places on the east coast of the United States from Fundy Bay to Cape Cod, in depths between 27 and 110 fm., but not in the Gulf of St. Lawrence (S. I. Smith).

#### 65. *Pandalus borealis* Kr.

1838. *Pandalus borealis* Krøyer, Naturh. Tidsskr. 2. B., p. 254.

1845. — — — Naturh. Tidsskr., Ny R., 1. B., p. 461.

1846. — — — Voy. en Scand., Crust. Pl. 6, figs. 2, a—o.

Occurrence. The "Ingolf" has taken this species at 10 localities.

Davis Straits: St. 31: 66° 35' N. L., 55° 54' W. L., 88 fm., temp. 16°; 5 spec.

— — — 29: 65° 34' — 54° 31' — 68 — — 02°; 8 —

Davis Straits: Ameragdla, head of Ameralik Fjord at Godthaab; 1 spec.

East of South Greenland: St. 94:  $64^{\circ} 56' N. L.$ ,  $36^{\circ} 19' W. L.$ , 204 fm., temp.  $4.1^{\circ}$ ; 1 spec.

North-West of Iceland: St. 129:  $66^{\circ} 35' - 23^{\circ} 47' - 117 - - 6.5^{\circ}$ ; 12 —

North of Iceland: St. 128:  $66^{\circ} 50' N. L.$ ,  $20^{\circ} 02' W. L.$ , 194 fm., temp.  $0.6^{\circ}$ ; 12 spec.

— - — -  $126: 67^{\circ} 19' - 15^{\circ} 52' - 293 - - \div 0.5^{\circ}$ ; 14 spec.

— - — -  $124: 67^{\circ} 40' - 15^{\circ} 40' - 495 - - \div 0.6^{\circ}$ ; 1 —

East of Iceland: St. 59:  $65^{\circ} 00' N. L.$ ,  $11^{\circ} 16' W. L.$ , 310 fm., temp.  $\div 0.1^{\circ}$ ; 2 spec.

North-West of the Færoes: St. 2:  $63^{\circ} 04' N. L.$ ,  $9^{\circ} 22' W. L.$ , 262 fm., temp.  $5.3^{\circ}$ ; 1 spec.

According to the Malac. Groenl. the species is very abundant from Umanak, ca.  $70^{\circ} 42' N. L.$ , southwards along the west coast of Greenland, in depths from 75 to 265 fm.; two of a number of later finds in the same waters were in shallower water, but it has also twice been taken near  $65\frac{1}{2}^{\circ} N. L.$  in depths such as 289 fm. and 349 fm., temp.  $4.5^{\circ}$  and  $3.2^{\circ}$  respectively. It has been taken further in the fjords along the north-west, north and east coasts of Iceland (Dyre Fjord, Patrik Fjord, Arnar Fjord, Skagestrand Bay, Skálfandi, Mid Fjord, Seydis Fjord, Røde Fjord, Faskrud Fjord) and is common more or less to sea off the same coastal regions in depths from 18—19 fm. to 287 fm.; on the other hand I know it from only two localities off the west or south coast of Iceland, namely,  $63^{\circ} 46' N. L.$ ,  $22^{\circ} 56' W. L.$ , 79 fm. ("Thor" 1903) and  $63\frac{1}{2}^{\circ} N. L.$ ,  $17^{\circ} 31' W. L.$ , 92 fm., temp.  $7^{\circ}$  (Wandel); it has not been taken at the Færoes. At East Greenland it has only been taken off Angmagsalik ( $65^{\circ} 37' N. L.$ ), 140 fm. (2<sup>nd</sup> Andrup Exped.), thus far to the south-west of the ridge across the Denmark Straits.

Distribution. The species occurs in the Skager Rak (Joh. Petersen), at Bohuslän (Goës) and up in the Christiania Fjord, sometimes in great depths on the west and south coasts of Norway (G. O. Sars), in the fjords of Finmark (G. O. Sars), from there to Bear Island and Spitzbergen, where it occurs nearly everywhere with exception of north and east of the most northern island, and goes northward to  $81^{\circ} 14' N. L.$  in depths from ca. 50 to 260 fm. and in temperatures most frequently above  $0^{\circ}$  (G. O. Sars, Ohlin, Doflein, Birula); lastly, a little south of Franz Joseph Land, 140 fm. (Heller). It is also found in the western and northern parts of the Murman Sea (Birula) and in the Barents Sea (Hoek); two specimens brought home by the "Dijmphna" were taken in the Kara Sea in 49 and 100 fm. (Hansen). — On the east coast of America it has been taken from Massachusetts Bay to Nova Scotia, 40 to 160 fm. (S. I. Smith, M. Rathbun). It is noted from the Sea of Ochotsk and Unaljaschka (Wosnesenski); and on the west coast of North America it is found in the Bering Sea and in the Pacific southward to  $46^{\circ} N. L.$ ,  $29\frac{1}{2} - 350$  fm. (Mary Rathbun).

The species is never littoral, it is met with in fjords in depths from scarcely 20 to 60 fm., but outside these usually in 80 to 300 fm.; it has been taken a single time in 495 fm. It is usually found in positive bottom-temperatures, but it appears especially from the "Ingolf's" results and Birula's statements (1907) that it can also occur in cold water, down to  $\div 1.8^{\circ}$ . It is obviously rare in the Kara Sea, though I believe that the two localities from this sea are correctly given by me (they occurred thus in the collection); that it has not been taken at northern East Greenland shows however, that it is scarcely so marked an arctic form as various other decapods (Ohlin expresses the opinion that it probably "ought not to be regarded as a true Arctic form, but rather as a North Atlantic (and North Pacific) species", but this view is somewhat exaggerated).

66. *Pandalus Montagu* Leach.

1814. *Pandalus Montagu* Leach, Edinburgh Encyclopædia, VII, p. 432 [teste Calman].  
 1845. — *annulicornis* Kroyer, Naturh. Tidsskr., Ny R., 1. B., p. 469.  
 1846. — — Kroyer, Voy. en Scand., Crust., Pl. 6, figs. 3 a—e.  
 ! 1899. — *Montagu* Calman, Ann. & Mag. Nat. Hist., Ser. 7, Vol. III, p. 30, Pls. I—IV, fig. 1.

Occurrence. The "Ingolf" has taken this species at four stations.

Baffin Bay: St. 33: 67° 57' N. L., 55° 30' W. L., 35 fm., temp. 0°8'; 19 spec.

North-West of Iceland: St. 129: 66° 35' N. L., 23° 47' W. L., 117 fm., temp. 6°5'; 1 spec.

North of Iceland: St. 127: 66° 33' N. L., 20° 05' W. L., 44 fm., temp. 5°6'; 13 spec.

South of East Iceland: St. 51: 64° 15' N. L., 14° 22' W. L., 68 fm., temp. 7°3'; 1 spec.

According to the data in Malac. Groenl., later finds and a statement by Ohlin, the species is not rare along the west coast of Greenland in the region from Godhavn at 69° 14' N. L. to Godthaab, 64° 11' N. L., in depths from 4 to 40 fm.; it has never been found on the east coast of Greenland nor at Jan Mayen. The species is common all round the coasts of Iceland (for example, it has been taken at Skagi, Stykkisholm, in Patrik Fjord, Dyre Fjord, Öundur Fjord, Öfjord, Seydis Fjord, Faskrud Fjord etc.) in depths from 3—4 fm. to 80 fm.; it is likewise very common at the Færoes from 1—3 fm. to 60 fm.

Distribution. The species is common along the whole coast of Great Britain (Calman), and has been taken at the Channel Islands (Norman), in Holland (Hoek), on the eastern side of the North Sea, in the Skager Rak and Kattegat, from there some distance into the Sound, within the Belts (Meinert) and in the most western part of the Baltic, in Kiel Bay and Eckernförde Bay (Möbius); also, along the whole coast of Norway (M. Sars); (Nordgaard notes it from a number of Norwegian fjords and from depths of ca. 10 to 160 fm.), on the coast of the western part of the Murman Sea and in the White Sea (Birula). On the east coast of America the species is found at Labrador, in the St. Lawrence, at Nova Scotia and goes further south past Cape Cod to 41° 25' N. L., usually in depths between 10 and 70 fm. (S. I. Smith). A form or variety, *P. Montagu tridens* M. Rathbun, is common along the west side of North America from the Bering Sea to 39° N. L., 3—351 fm. (Mary Rathbun).

This species is common in England in "tide-pools" and the greatest certain depths for it are 116 fm. ("Ingolf" St. 129) and 121 fm. (Rathbun), Smith's statement (Trans. Conn. Acad. Vol. V) of a single occurrence in 430 fm. having to be regarded with some doubt until a trustworthy, new, similar observation has been made in the Atlantic.

Remarks. The largest specimen I have seen measures 105 mm. from the tip of the rostrum to the end of the telson; it was taken at 65° 18' N. L., 53° 21' W. L., 65 fm., temp. 1° (Wandel).

67. *Pandalus propinquus* G. O. Sars.

1870. *Pandalus propinquus* G. O. Sars, Forh. Vid. Selsk. Christiania f. 1869, p. 148.  
 1886. — — S. I. Smith, Rep. U. S. Comm. Fish and Fisheries for 1885, Pl. XIII, fig. 1.  
 ! 1899. — — Calman, Ann. & Mag. Nat. Hist., Ser. 7, Vol. III, p. 32, Pls. I—IV, fig. 2.

Occurrence. The "Ingolf" has taken this species at 18 stations.

Davis Straits: St. 32: 66° 35' N. L., 56° 38' W. L., 318 fm., temp. 3.9°; 1 spec.

— — - 35: 65° 16' — 55° 05' — 362 — — 3.6°; 1 —

— — - 27: 64° 54' — 55° 10' — 393 — — 3.8°; 1 —

— — - 25: 63° 30' — 54° 25' — 582 — — 3.3°; 2 —

West of Iceland: St. 90: 64° 45' N. L., 29° 06' W. L., 568 fm., temp. 4.4°; 2 spec.

— - — - 89: 64° 45' — 27° 20' — 310 — — 8.4°; 2 —

— - — - 9: 64° 18' — 27° 00' — 295 — — 5.8°; 3 —

South-West of Iceland: St. 85: 63° 21' N. L., 25° 21' W. L., 170 fm., temp. ? ; 1 spec.

— - — - 83: 62° 25' — 28° 30' — 912 — — 3.5°; 1 —

— - — - 81: 61° 44' — 27° 00' — 485 — — 6.1°; 1 —

— - — - 78: 60° 37' — 27° 52' — 799 — — 4.5°; numerous spec.

South of Iceland: St. 64: 62° 06' N. L., 19° 00' W. L., 1041 fm., temp. 3.1°; 3 spec.

— - — - 65: 61° 33' — 19° 00' — 1089 — — 3.0°; 1 —

— - — - 54: 63° 08' — 15° 40' — 691 — — 3.9°; 1 —

— - — - 53: 63° 15' — 15° 07' — 795 — — 3.8°; 1 —

— - — - 57: 63° 37' — 13° 02' — 390 — — 3.4°; 3 —

West of the Færoes: St. 47: 61° 32' N. L., 13° 40' W. L., 950 fm., temp. 3.2°; 1 spec.

— - — - 46: 61° 32' — 11° 36' — 720 — — 2.4°; 2 —

Within the region where it was taken by the "Ingolf" it has also been found several times by Wandel and the "Thor".

**Distribution.** It has been taken twice in the lochs on the west coast of Scotland, at one of these places in 40 fm. (Calman), at several places on the west coast of Norway in 80 to 300 fm. (G. O. Sars), and it goes up to Malangen, ca. 69½° N. L. (Nordgaard); lastly, it has been taken a number of times on the east coast of New England, as far south as 39½° N. L., in 116 to 640 fm. (Smith, M. Rathbun). According to the data above it goes with the warm Atlantic water up into Davis Straits at least to 66° 35' N. L., and is common in the deep water down to 1089 fm. in the waters west and south of Iceland. The bottom-temperature is usually over 3°, a single time 2.4°.

**Remarks.** For this as for the foregoing and the two following species reference may be made to Calman's careful descriptions. I shall only remark on a single point. Calman says that the carpus of the second right leg is divided by 4 articulations, that is, into 5 joints; Sars gives 6. Calman's number is by far the most common, but it may still be somewhat higher; on an extremely characteristic specimen from St. 54 I found 7 distinct articulations; the proximal joint further was divided into two weak articulations only seen in a certain light, so that the carpus in this case had really 10 joints. — None of my specimens attain the length given by Sars and Smith.

## 68. *Pandalus Bonnieri* Caull.

1882. *Pandalus leptorhynchus* G. O. Sars, Vid. Selsk. Forh. Christiania for 1882, No. 18, p. 47, Tab. I, Fig. 8—10.

1896. *Dichelopandalus Bonnier* Caullery, Ann. l'Univ. Lyon, 1896, p. 379, Pl. XV, Fig. 7—15.

! 1899. *Pandalus Bonnier* Calman, Ann. & Mag. Nat. Hist. Sec. 7, Vol. III, p. 34, Pls. I—IV, fig. 3.

Occurrence. The "Ingolf" has not found this species, but in 1903 it was twice taken by the "Thor" a little to the south of Iceland: namely:  $63^{\circ} 15' \text{ N. L.}$ ,  $22^{\circ} 23' \text{ W. L.}$ , 114–173 fm. and  $63^{\circ} 16' \text{ N. L.}$ ,  $19^{\circ} 57' \text{ W. L.}$ , 137–207 fm.

Distribution. Calman gives the species from two lochs on the west coast of Scotland, from Rockall and off the south-west coast of Ireland. The depths were from 40 to 214 fm. Caullery gives it from the Bay of Gascony in depths from 95 to 638 fm. Sars and Appellöf notes it from Drøbak in Christiania Fjord, from Bergen, Sogne Fjord and Aalesund, thus up to ca.  $62\frac{1}{2}^{\circ} \text{ N. L.}$ , depths 60–230 fm.; further, it is given from Salten Fjord ca.  $67\frac{1}{3}^{\circ} \text{ N. L.}$ , 170–200 fm. (Nordgaard); I have seen one specimen taken to the west of the most southern part of Norway:  $58^{\circ} 32' \text{ N. L.}$ ,  $4^{\circ} 18' \text{ E. L.}$ , 149 fm. (Joh. Schmidt).

#### 69. *Pandalina brevirostris* Rathke.

1843. *Pandalus brevirostris* Rathke, Nova Acta Ac. Cæs. Leop.-Car., Tab. XX, p. 17.

1863. — — Heller, Crust. südl. Eur., p. 247, Taf. VIII, Fig. 9.

1982. — — Hoek, Ned. Arch. für Zool., Suppl. I, Crust. p. 22, Taf. I, Fig. 10.

! 1899. *Pandalina* — Calman, Ann. & Mag. Nat. Hist., Sec. 7, Vol. III, p. 37, Pls. I–IV, fig. 4.

Occurrence. It has not been taken by the "Ingolf". I have only seen a single specimen, taken at Trangisvaag in the most southern part of the Færoes, 8–9½ fm. (Dr. F. Jørgensen).

Distribution. The species is common at Shetland (Norman), is met with all round the coasts of Great Britain (Calman), and is found on the northern and north-western coasts of France (Bonnier). It has several times been taken in the Mediterranean, thus at the Cyclades (Adensamer), in the Adriatic Sea at several places (Heller, Adensamer), on the east coast of Sardinia (Senna), the depth varying from 16 to 235 fm.; according to Senna the "Travailleur" has taken it (in the Mediterranean?) at 566 fm. In northern seas it has been taken at the coast of Holland, 10 fm. (Hoek), also in the Kattegat and in the northernmost part of the Sound in depths from  $10\frac{1}{2}$  to 26 fm. (Meinert), at Bohuslän (Goës), along the coast of Norway to Malangen,  $69^{\circ} 33' \text{ N. L.}$  (Nordgaard); it has not been mentioned from East Finmark by Norman nor by Birula from the Murman Sea. Nordgaard gives numerous localities on the west coast of Norway, but most of the depths are from 100 to 200 fm., in a single case even over 300 fm., which makes me think that the species has perhaps not come into the fishing apparatus at the very bottom. Hoek (l. c.) gives it from  $74^{\circ} 16' \text{ N. L.}$ ,  $29^{\circ} 47' \text{ E. L.}$ , 192 fm.; this find is extremely interesting and may be considered correct, it seems to me, as the possibility of an error in determination appears excluded, and we can hardly have doubts as to the locality; according to the chart in the "Norwegian North-Atlantic Expedition" this locality lies within the area with bottom-temperatures over  $0^{\circ}$ .

#### 70. *Nematocarcinus exilis* Bate.

1888. *Stochasmus exilis* Bate, Rep. Challenger Vol. XXIV, p. 823, Pl. CXXXII, fig. 14.

! 1896. *Nematocarcinus exilis* Calman, Trans. Roy. Irish Acad. Vol. XXXI, Part I, p. 6.

Occurrence. The "Ingolf" has taken this species at 7 stations.



South-West of Iceland: St. 74: 62° 17' N. L., 24° 36' W. L., 695 fm., temp. 4.2°; 1 spec.

South of Iceland: St. 68: 62° 06' N. L., 22° 30' W. L., 843 fm., temp. 3.4°; 2 spec.

— - — - 67: 61° 30' — 22° 30' — 975 — — 3.0°; fragments.

— - — - 40: 62° 00' — 21° 36' — 845 — — 3.3°; 10 spec.

— - — - 66: 61° 33' — 20° 43' — 1128 — — 3.3°; 1 —

— - — - 63: 62° 40' — 19° 05' — 800 — — 4.0°; 1 —

— - — - 47: 61° 32' — 13° 40' — 950 — — 3.2°; 1 —

**Distribution.** Sp. Bate's single specimen was taken in the neighbourhood of the Canary Isles. Many specimens were taken south-west of Ireland, 750 fm. (Calman). According to the above it is a purely deep-water form from the Atlantic; it has without doubt a much greater geographical distribution than as yet known.

**Remarks.** My specimens agree with Calman's remarks; further, before I read this author, I had considered them to belong to Bate's species. It differs from *N. ensiferus* Bate in the shorter rostrum, the length of which is between that in *N. ensiferus* and *N. cursor* A. M.-Edw.; it also differs from *N. ensiferus* in that the eyes seem a little larger; further, the posterior corner of the fifth abdominal segment is less drawn out though it ends in a very small or rudimentary spine; lastly, the third abdominal segment is dorsally less produced than in *N. ensiferus*.

#### 71. *Acantheephyra purpurea* A. Milne-Edw.<sup>1</sup>

1881. *Acantheephyra purpurea* A. Milne-Edwards, Comp. Rend. Ac. Sc. Paris, T. XCIII, p. 933.

! 1882. *Miersia Agassizii* S. I. Smith, Bull. Mus. Comp. Zool. X, p. 67, Pl. XI, figs. 5—7, Pl. XII, figs. 1—4.

1884. *Acantheephyra Agassizii* S. I. Smith, Rep. U. S. Comm. Fish & Fishery for 1882, p. 372, Pl. VIII, fig. 1.

1886. — — S. I. Smith, Rep. U. S. Comm. Fish & Fishery for 1885, p. 667, Pl. XV, figs. 1, 6, a. 7; Pl. XIV, fig. 2.

1888. — *purpurea* Sp. Bate, Rep. Challenger, Vol. XXIV, p. 733, Pl. CXXIV, fig. 3.

**Occurrence.** The species has been taken by the "Ingolf" at 6 stations.

Davis Straits: St. 25: 63° 30' N. L., 54° 25' W. L., 582 fm., temp. 3.3°; 1 spec.

West of Iceland: St. 12: 64° 38' N. L., 32° 37' W. L., 1040 fm., temp. 0.3°; 1 spec.

— - — - 11: 64° 34' — 31° 12' — 1300 — — 1.6°; 1 —

— - — - 91: 64° 44' — 31° 0' — 1236 — — 3.1°; 1 —

South-West of Iceland: St. 17: 62° 49' N. L., 26° 58' W. L., 745 fm., temp. 3.4°; 1 spec.

South of Iceland: St. 69: 62° 40' N. L., 22° 17' W. L., 589 fm., temp. 3.9°; 1 spec.

Further, it has been taken at 62° 11' N. L., 19° 36' W. L., 1000—1100 fm. ("Thor") and south-west of the Færoes at 59° 28' N. L., 8° 1' W. L., 687 fm. (Bergen Museum). In 1904 it was taken by the "Thor" at the following places:

<sup>1</sup> After the text on this species was written I received Stanley W. Kemp's very elaborate study on *Acantheephyra* in "Fisheries, Ireland, Sci. Invest. 1905, L, [1906]". The author spends more than twelve pages on *A. purpurea*, giving the dreadful synonymy and numerous new details on its characters, variation, distribution, etc. Instead of adding to my own text, I have preferred to refer readers to Mr. Kemp's paper.

West of North Iceland:  $65^{\circ}00'N.L.$ ,  $28^{\circ}10'W.L.$ , young-fish trawl, 1000 m. wire out, depth of the sea 1240 m.; 2 spec.

South of Iceland:  $61^{\circ}34'N.L.$ ,  $19^{\circ}05'W.L.$ , young-fish trawl, 1800 m. wire out, depth of the sea 2160 m.; 4 spec.

South of Iceland:  $61^{\circ}30'N.L.$ ,  $17^{\circ}08'W.L.$ , young-fish trawl, 1800 m. wire out, depth of the sea ? m.; 8 small spec.

South of Iceland:  $62^{\circ}47'N.L.$ ,  $15^{\circ}03'W.L.$ , young-fish trawl, 1500 m. wire out, depth of the sea 1950 m.; 1 spec.

Distribution. On the European side of the Atlantic, this species has been taken in the Bay of Gascony, 425 fm. (Caullery), off Portugal, 1378 fm. (A. Milne-Edwards), south-west of the Azores, 1675 fm., and at the Canary Isles, 1675 fm. (Sp. Bate), also south of the Cape Verde Isles at 2128 fm. and in the vertical net from 0 to 213 fm. (Ortmann). In the Mediterranean it has been taken at Messina (Riggio) and near Monaco, at the last place in a large net sunk to a little over 1000 fm. (Lo Bianco). It has also been taken northwest of the Bermudas, 2675 fm. (Sp. Bate) and at a number of places off the east coast of America between  $31^{\circ}41'N.L.$  and  $42^{\circ}2'N.L.$ , the depths varying from 105 to 2949 fm. (S. I. Smith). But Smith writes further (Rep. Comm. Fish... for 1885, p. 63), that a single specimen was taken "at the surface in a dip-net, and was kept alive for half an hour". This and another reason given induced Smith to write: "These facts lead me to suppose that this species is not a habitual inhabitant of the bottom at great depths, but more probably a truly free-swimming inhabitant of some part of the vast region intermediate between the surface and the bottom, such a one as might occasionally stray to the surface or to considerable depths". The observations mentioned by Ortmann and Lo Bianco of specimens taken in the vertical net agree with this. To judge from the structure of the animal and from the 4 catches made by the "Thor" in 1904, Smith's supposition seems quite justified.

Whether the specimens referred by Faxon (Mem. Mus. Comp. Zool. XVIII, p. 161) with a query to *A. Agassizii* really belong to this species, I am unable to determine; they came from the Pacific in the Gulf of Panama and somewhat further south.

Remarks. It is perhaps right to add that the specimens investigated by me certainly belong to the *A. Agassizii* so well described and figured by Smith; in referring it as synonym to *A. purpurea* I have only followed the authors. — At the time of capture of the specimens taken by the "Ingolf" at St. 11 and St. 12 it was noted: "animals clear, blood-red all over, eyes black".

## 72. *Acanthephyra gracilis* S. I. Smith.

! 1882. *Miersia gracilis* S. I. Smith, Bull. Mus. Comp. Zool. Vol. X, p. 70, Pl. XI, figs. 4—4d; Pl. XII, fig. 10.  
1886. — — S. I. Smith, Rep. Comm. Fish and Fisher. for 1885, p. 672.

Occurrence. The "Ingolf" has not taken this species but it was brought home in 1904 by the "Thor" from the following locality.

South of Iceland:  $62^{\circ}47'N.L.$ ,  $15^{\circ}03'W.L.$ , 1950 m., young-fish trawl, 1500 m. wire out; 1 spec.

Distribution. The species was founded on a specimen taken off the east coast of America

at  $34^{\circ}28'25''$  N.L.,  $75^{\circ}22'50''$  W.L., 1632 fm.; later, a specimen was taken somewhat more to the north, namely,  $36^{\circ}05'5''$  N.L., of the same coast at 2512 fm. In 1905 a number of specimens were captured by the "Thor" in the young-fish trawl at two stations respectively west of the Channel and west of Brittany. The species is a bottom form certainly just as little as *A. purpurea*. The length of the wire out was in five catches respectively 1800, 900, 300, 300 and 200 m.; with 200 m. out only quite small specimens were taken, while the two largest specimens were taken with 1800 and 900 m., and with 900 m. both large and rather small specimens were taken.

Remarks. In his above mentioned paper Stanley Kemp refers *A. gracilis* Smith as a synonym to *A. debilis* A. M.-Edw. Not having seen the French author's figure I have no opinion on the question. My specimens agree well with the description and figure given by Smith, but not so well with Kemp's description and figures of *A. debilis*. The lateral plates of the fifth abdominal segment have their posterior margin less convex than in Kemp's fig. 4 and possess nearly always the marginal tooth pointed out by Smith. Further, the telson has several dorsal pairs of spines in front of the large pair, and the terminal part beyond the last pair of spines is considerably longer than shown by Kemp. Finally, I cannot see any vestige of the luminous organs described by Kemp. For these reasons I must leave the question of synonymy to future investigators.

### 73. *AcanthePHYRA Batei* Faxon.

Pl. IV, fig. 2 a (named *A. brevirostris*).

1888. *AcanthePHYRA brevirostris* Sp. Bate, Rep. Challenger, Vol. XXIV, p. 751, Pl. CXXVI, figs. 5—6.  
1897. — *batei*, Faxon, Mem. Mus. Comp. Zool., Vol. XVIII, p. 167.

Occurrence. The "Ingolf" has not found this species but it was brought home in 1904 by the "Thor" from the following locality.

South of Iceland:  $61^{\circ}30'$  N.L.,  $17^{\circ}08'$  W.L., young-fish trawl, 1800 m. wire out; 1 spec.

Distribution. The species was founded on two specimens taken in the Atlantic at  $1^{\circ}22'$  N.L.,  $26^{\circ}36'$  W.L., 1500 fm. No other specimens are mentioned in the literature. The species is certainly not a bottom form; the specimen examined by me can scarcely have been in greater depths than ca. 400 fm., so that it was living pelagically in the intermediate layers.

Remarks. The "Thor" specimen is 60 mm. long. The carapace is greenish, lighter or darker chiefly according to the colour of the tissues underneath. The dorsal aspect of the first three abdominal segments is gray-green, the lateral surfaces much lighter. The carapace is furnished with a high, sharp keel along the whole length of the median line; the front part of this keel and the rostrum together with 10 dorsal spines, the rostrum which is somewhat bent upwards with 1 spine, at the middle of the lower margin; the rostrum is more strongly bent upwards than Bate's fig. 5 shows. The lateral keel of the carapace begins a little behind the orbital margin, continues right to the posterior margin and is very obvious. The first and second abdominal segments have no dorsal keel, the four following have a sharp dorsal ridge along their whole length and on the 4<sup>th</sup> to the 6<sup>th</sup> the ridge runs out into a fairly small spine. The telson has 3 small spines on the sharp distal section of each of the two ridges; the truncated end has 5 spines, of which the lateral pair are long, the three others

fairly short. — There is no doubt that the specimen belongs to *A. brevirostris*; there was no reason for Bate to consider the one of his two specimens as a variety.

#### 74. *Pasiphaë tarda* Kr.

! 1845. *Pasiphaë tarda* Krøyer, Naturhist. Tidsskr., Ny R., I. B., p. 434.

1846. — — Krøyer, Voy. en Scand., Crust., Pl. I, A. B. a—o.

! 1868. — norvegica M. Sars, Nyt Mag. for Naturv. B. 15, p. 282, Pl. I—V, Fig. 65—86; Pl. V, Fig. 81, 87—90.

Occurrence. The "Ingolf" has taken this species at 5 stations.

Davis Straits: St. 28: 65° 14' N. L., 55° 42' W. L., 420 fm., temp. 3.5°; fragments of 3 spec.

West of Iceland: St. 97: 65° 28' N. L., 27° 39' W. L., 450 fm., temp. 5.5°; 1 spec.

South-West of Iceland: St. 81: 61° 44' N. L., 27° 00' W. L., 485 fm., temp. 6.1°; 1 spec.

North of East Iceland: - 126: 67° 19' — 15° 52' — 293 — — ÷ 0.5°; 1 spec.

South of Jan Mayen: - 116: 70° 05' — 8° 26' — 371 — — ÷ 0.4°; 4 —

Krøyer founded the species on two specimens from the southernmost part of West Greenland. In 1904 it was taken by the "Thor" at no fewer than 9 localities, namely, at 3 places west of Iceland from 65° to ca. 65½° N. L., 27° 10' to 28° 10' W. L., young-fish trawl, 740, 763 and 1240 meters wire out; north of east Iceland at 67° 19' N. L., 17° 55' W. L., young-fish trawl, 800 meters wire out; at 3 places south of Iceland, young-fish trawl, 100, 800 and 1800 meters wire out; lastly, twice south-west of the Faeroes, young-fish trawl, 820 and 900 meters wire out; a number of specimens were taken south-west of the Faeroes, at 61° 7' N. L., 9° 33' W. L., 425—460 fm., by the "Michael Sars". Ortmann mentions one specimen taken in the vertical net, 0—600 meters, not far from the "Ingolf" station 81.

Distribution. In the North Sea one specimen has been taken off northern Jutland on the surface (Meinert); in the Skager Rak it is fairly common pelagically in deeper layers ("Thor"); it occurs along the south and west coasts of Norway from Christiania Fjord "at any rate to Lofoten" (G. O. Sars), it has later been taken even at Malangen, 69° 33' N. L. (Nordgaard). It has also been taken in the Norwegian Sea far to the west of Norway at 3 stations with very great depths and bottom-temperatures from ÷ 1.1° to ÷ 1.3° (G. O. Sars), lastly in the vertical net at 3 places from 73° to 73½° N. L., 2° to 2° 50' W. L. (Ohlin). S. I. Smith has seen specimens from places off the east coast of America, Massachusetts, where it goes no further south than Cape Cod. Lo Bianco states that he has seen specimens from a number of localities in the Mediterranean off the west coast of Italy, but some of his determinations of Crustacea are not trustworthy.

The species is pelagic as supposed by Sars; it lives often, perhaps as a rule, in depths from 150 to 300 fm., but can also swim much nearer the surface and apparently goes still deeper down sometimes. I think however that it always keeps to water-layers with temperature above 0°; this agrees with the "Ingolf" stations 28, 97 and 81, with almost all the "Thor" localities and a number of the others. In the Norwegian Sea it goes in my opinion with the warm surface-current towards the north and north-west, but does not go down into the lower layers with temperatures below 0°.

Remarks. The largest of the specimens taken by the "Ingolf", from St. 116, is 96 mm. long; a female with eggs came from 61° 7' N. L., 9° 33' W. L. (Bergen Museum) and measured 143 mm. from tip of rostrum to end of telson.

**75. *Parapasiphaë sulcatifrons* S. I. Smith.**

1884. *Parapasiphaë sulcatifrons* S. I. Smith, Rep. Comm. Fish and Fisher. for 1882, p. 384, Pl. V, fig. 4; Pl. VI, figs. 1-7.

Occurrence. The "Ingolf" has once taken this beautiful form.

West of Iceland: St. 91: 64° 44' N.L., 31° 00' W.L., 1236 fm., temp. 3° 1'; 1 spec.

The locality lies midway between Greenland and the west coast of Iceland.

In 1904, the species was twice taken by the "Thor", namely,

South of Iceland: 61° 34' N.L., 19° 05' W.L., 2160 m., young-fish trawl, 1800 m. wire out; 9 spec.

— - — 61° 30' — 17° 08' — ? m. — — 1800 m. — 15 —

Distribution. The species was previously known only from the east coast of America from 35° 12' N.L. to 41° 53' N.L.; the depths varied from 515 to 2949 fm. It is extremely probable however that this form is never a bottom-animal, but that the larger specimens live pelagically in deep water, the smaller often in less depths; the specimens taken by the "Thor" were not in greater depths than at most 400 fm., that is, nearer the surface than the bottom.

Remarks. The "Ingolf" specimen is 75 mm. long; the largest of the other specimens is only 45 mm. and the other 23 smaller to quite small; some of them are really only larvæ with rudimentary abdominal limbs.

**76. *Hymenodora glacialis* Buchl.**

1874. *Pasiphaë glacialis* Buchholz, Zweite Deutsche Nordpolarfahrt, B. II, p. 279, Taf. I, Fig. 2.  
1885. *Hymenodora glacialis* G. O. Sars, Norske Nordhavs-Exped., Crust. I, p. 35, Pl. IV.

Occurrence. It has been taken by the "Ingolf" at 16 stations.

North of East Iceland: St. 125: 68° 08' N.L., 16° 02' W.L., 729 fm., temp. ÷ 0° 8'; 1 spec.

South of Jan Mayen: - 113: 69° 31' — 7° 06' — 1309 — — ÷ 1° 0'; 6 —

— - — - 117: 69° 13' — 8° 23' — 1003 — — ÷ 1° 0'; 12 —

— - — - 118: 88° 27' — 8° 20' — 1060 — — ÷ 1° 0'; 2 —

— - — - 112: 67° 57' — 6° 44' — 1267 — — ÷ 1° 1'; 8 —

North-East of Iceland: - 119: 67° 53' — 10° 19' — 1010 — — ÷ 1° 0'; 6 —

— - — - 120: 67° 29' — 11° 32' — 885 — — ÷ 1° 0'; 9 —

— - — - 111: 67° 14' — 8° 48' — 860 — — ÷ 0° 9'; 3 —

— - — - 110: 66° 44' — 11° 23' — 781 — — ÷ 0° 8'; 1 —

East of Iceland: St. 101: 66° 23' N.L., 12° 05' W.L., 537 fm., temp. ÷ 0° 7'; 1 spec.

— - — - 102: 66° 23' — 10° 26' — 750 — — ÷ 0° 9'; 9 —

— - — - 103: 66° 23' — 8° 52' — 579 — — ÷ 0° 6'; 3 —

— - — - 104: 66° 23' — 7° 25' — 957 — — ÷ 1° 1'; 11 —

— - — - 105: 65° 34' — 7° 31' — 762 — — ÷ 0° 8'; 11 —

North of the Færoes: St. 139: 63° 36' N.L., 7° 30' W.L., 702 fm., temp. ÷ 0° 6'; 1 spec.

— - — - 140: 63° 29' — 6° 57' — 780 — — ÷ 0° 9'; 7 —

This species has never been taken at West Greenland. On the other hand, I have seen a specimen from the south of Iceland: 62° 11' N.L., 19° 36' W.L., 1010-1145 fm., temp. (in 1010 fm.) 275°

("Thor"). Norman gives it from the Færoe Channel:  $60^{\circ} 3' \text{ N. L.}$ ,  $5^{\circ} 51' \text{ W. L.}$ , 540 fm., temp.  $\div 14^{\circ}$ . It was taken three times by the 2<sup>nd</sup> Amdrup Expedition: several half-digested specimens in the stomach of *Procellaria glacialis* from  $69^{\circ} 51' \text{ N. L.}$ ,  $11^{\circ} 18' \text{ W. L.}$ , thus between Iceland and Jan Mayen; also in the stomach of the same species of bird from  $74\frac{1}{3}^{\circ} \text{ N. L.}$ ,  $9\frac{2}{3}^{\circ} \text{ W. L.}$ , thus far to the north of Jan Mayen and just as far from East Greenland; and at  $74^{\circ} 12' \text{ N. L.}$ ,  $12^{\circ} \text{ W. L.}$  one specimen "in ice hemmed in between ice-blocks". The species was founded on a specimen taken at the surface of the sea at ca.  $74^{\circ} \text{ N. L.}$  "in beträchtlicher Entfernung von der Grenze des Packeises"; it has also been taken at  $72^{\circ} 42' \text{ N. L.}$  between Greenland and Jan Mayen, 1064 fm., and off Kaiser Franz Joseph Fjord (a little north of  $73^{\circ} \text{ N. L.}$ ), 133 fm. (Ohlin).

Distribution. The species was taken by the Norwegian North-Atlantic Expedition at 14 stations, all belonging to the cold area of the Norwegian Sea; the most southerly of these stations was at  $63^{\circ} 5' \text{ N. L.}$ , the most northerly west of Spitzbergen at  $79^{\circ} 59' \text{ N. L.}$ , the depths varied from 452 to 1861 fm. A specimen was also taken in the stomach of a bottom-fish, *Lycodes frigidus* Coll., at a station west of Spitzbergen in 1333 fm. depth and another in the stomach of another deep-water fish, *Raja hyperboræa* Coll. It is noted by Ohlin and Birula from several stations in the same area, at three of these it was taken in the vertical net in depths from 0—2000, 0—2700 and 0—3000 meters. On the east coast of America it has been taken four times between  $37^{\circ} 12' \text{ N. L.}$  and  $42^{\circ} 48' \text{ N. L.}$ , depths from 826 to 2949 im. (Smith, M. Rathbun). It is also given from the Bering Sea south of the Pribiloff Islands, 1401 fm., and from a place east of Prince of Wales Island, Alaska, 1569 fm. (M. Rathbun). According to Faxon and M. Rathbun it has been taken three times in the Gulf of California, 857, 905 and 1208 fm.; lastly, according to Faxon in the Gulf of Panama, 1832 fm., and off Ecuador, 1740 fm.

G. O. Sars l. c. writes concerning *H. glacialis*: "According to its whole organisation this form must seemingly be considered to lead a kind of half pelagic life, in other words, I have reason to believe that it is not... very much bound to the bottom, but swims free up in the water. Yet the rudimentary condition of the eyes indicate with certainty that its habitat is chiefly in the deeper water-layers, which also is fully confirmed by the observations made on our expedition". According to all available information the species must be pelagic and its central region of distribution the cold area of the Norwegian Sea; as it was twice taken in the stomach of bottom fish from great depths it can thus go down to over 1300 fm.; as it was twice taken in the stomach of birds and once on the surface it is obviously sometimes up in the surface-layers between 0 and 10 fm. But its geographical distribution is so remarkable that I am quite unable to give any reasonable explanation of it. Miss M. Rathbun, who is known often to set up a number of species very near to one another, has informed me that she has seen specimens from Ecuador, Gulf of California, Bering Sea, Alaska and Færoe Channel and considers them all of the same species, so that an error in determination is scarcely probable.

Remarks. I have endeavoured in vain to find some difference between my large material from the Norwegian Sea and the specimen taken south of Iceland, which might countenance the view that the last-mentioned belonged to another species. — My largest specimen (from "Ingolf" St. 103) is only 68 mm. long; Sars gives 83 mm. as the greatest length, but perhaps he measured his specimens from the tip of the antennal squama instead of from the tip of the rostrum.

77. *Gennadas elegans* S. I. Smith.

! 1882. *Amalopeneus elegans* S. I. Smith, Bull. Mus. Comp. Zool., Vol. X, No. 1, p. 87, Pl. XIV, figs. 8—14,  
Pl. XV, figs. 1—15.

1903. — — Calman, Ann. & Mag. Nat. Hist., Ser. 7, Vol. XI, p. 416.

1906. *Gennadas elegans* Bouvier, Bull. Musée Océan. Monaco, No. 80.

Occurrence. The "Ingolf" has brought home this species from 8 stations.

Davis Straits: St. 25: 63° 30' N. L., 54° 25' W. L., 582 fm., temp. 3°3'; 2 spec.

West of Iceland: St. 12: 64° 38' N. L., 32° 37' W. L., 1040 fm., temp. 0°3'; 2 spec.

— - — - 11: 64° 34' — 31° 12' — 1300 — — 1°6'; 1 —

South-West of Iceland: St. 83: 62° 25' N. L., 28° 30' W. L., 912 fm., temp. 3°5'; 1 spec.

South of Iceland: St. 67: 61° 30' N. L., 22° 30' W. L., 975 fm., temp. 3°0'; 1 spec.

— - — - 69: 62° 40' — 22° 17' — 589 — — 3°9'; 1 —

— - — - 40: 62° 00' — 21° 36' — 845 — — 3°3'; 1 —

East of Iceland: - 105: 65° 34' — 7° 31' — 762 — — 0°8'; 1 —

In Malac. Groenl. it is mentioned that a specimen was taken in a fish at Sukkertoppen, a colony in West Greenland at 65° 25' N. L. In 1903 and 1904 it was taken five times by the "Thor". Four of these stations are in the deep water south of Iceland, from 62° 47' N. L. to 61° 30' N. L., 19° 36' W. L. to 15° 03' W. L.; at three of these stations at least it was taken pelagically in the young-fish trawl with 1800 to 1950 meters wire out; the fifth station lies "West of Iceland: 65° 00' N. L., 28° 10' W. L., young-fish trawl, 1000 meters wire out (depth of sea 1240 meters)". Concerning St. 105 see under distribution.

Distribution. This species has been taken off the east coast of North America at localities lying between 41° 13' N. L. and 31° 41' N. L.; the depths were from 372 to 2369 fm. (Smith). One specimen was taken at 52° 18' N. L., 15° 53' W. L. with the pelagic net sunk to 1410 fm. (Calman). Ortmann states that it was taken in the Sargasso Sea with a closing net from 690—800 fm., and also south of Cape Verde Islands in a vertical haul from 0—213 fm., but whether his specimens really belonged to *G. elegans* or at least some of them to any of the species later established by Bouvier it is impossible to say. Bouvier says on the distribution: Atlantique, Méditerranée.

This species is not a bottom-form but lives pelagically, as a rule certainly in the deeper layers, sometimes in higher layers. Bate has already expressed the same opinion regarding the genera *Gennadas* and *Benthesicymus*. It is probably distributed throughout the deeper parts of the Atlantic, but it is lacking in the sea between Norway and Greenland—Iceland—the Færoes. As mentioned above a specimen has indeed been taken in that sea at St. 105, and though this is in all probability correct, it does not show in my opinion that the species lives in the cold area; the specimen must have been carried there by the Gulf Stream.

Remarks. The genus *Gennadas* greatly needs revision, and it is to be hoped that Prof. Bouvier will examine the "Challenger" specimens and more fresh material from the Indian Ocean and the Pacific. Ortmann and especially Calman have remarked on the lack of agreement and the difficulties in connection with the descriptions of the gills in Smith, Bate and Alcock. It may be added

that I have examined the gills in many of my specimens and found them agreeing with the formula given by Smith (l. c., p. 86).

### 78, *Sergestes arcticus* Krøyer.

1856. *Sergestes arcticus* Krøyer, Overs. Kgl. Danske Vid. Selsk. Forh. i 1855, p. 27.  
 ! 1859. — — Krøyer, Kgl. Danske Vid. Selsk. Skrifter, 5. R., Naturv. og mathem. Afd., B. 4, 1859, p. 240; Tab. III, Fig. 7 a—g, Tab. V, Fig. 16.  
 1875. — Meyeri Metzger, Jahresber. Comm. zur wiss. Untersuch. der Deutschen Meere in Kiel für die Jahre 1872, 1873, p. 302, Tab. VI, Fig. 7.  
 1882. — *arcticus* S. I. Smith, Bull. Mus. Comp. Zool., Vol. X, No. 1, p. 96, Pl. XVI, fig. 4.  
 1886. — — S. I. Smith, Rep. Comm. Fish and Fisher. f. 1885, p. 696, Pl. XX, figs. 1, 2.  
 1888. — *magnificus* Chun, Bibliotheca Zool., B. 1, p. 33, Taf. IV, Fig. 4 & 5.  
 ! 1897. — *arcticus* H. J. Hansen, Proc. Zool. Soc., London f. 1896, p. 949, 954—56.  
 1903. — — H. J. Hansen, Proc. Zool. Soc. Lond. f. 1903, p. 60, Pl. XII, figs. 1 a—1 c.

Occurrence. The "Ingolf" has taken this species four times.

West of Iceland: St. 12: 64° 38' N. L., 32° 37' W. L., 1040 fm., temp. 0.3°; 2 spec.

— - — - 9: 64° 18' — 27° 00' — 295 — — 5.8°; 3 —

South - — - 67: 61° 30' — 22° 30' — 975 — — 3.0°; 1 —

North of the Færoes: St. 140: 63° 29' N. L., 6° 57' W. L., 780 fm., temp. ÷ 0.9°; 1 spec.

Krøyer's original specimen was taken at West Greenland at "60° odd N. L.", from which it may be concluded that it was taken in the Davis Straits. In 1903 and especially in 1904 the "Thor" has frequently taken this species, at 15 stations in all, in at least almost all cases with the young-fish trawl far above the bottom. A short account of these catches may be given here. To the west of Iceland it was taken at 65° 20' N. L., 27° 12½' W. L., young-fish trawl, 870 meters wire out, and at 65° 00' N. L., 28° 10' W. L., 1000 meters wire out. South of Iceland it was taken a number of times at places between 22° 23' W. L. and 17° 08' W. L., the latitude varying between 63° 15' and 61½°; the length of wire out was in two cases only 100 meters, in other cases 750—800 and 1800 meters. Two of the "Thor's" stations lie north of the Færoes (length of wire out, 1200 and 1500 meters), two of them were south-west of these islands (wire out in the one case, 820 meters).

Distribution. The species is noted from two places in the Irminger Sea at 60° N. L., to the south-west and west of West Iceland, likewise from two places west of the Orkney Isles, being taken all four times in a vertical net (Ortmann). On the west coast of Norway it goes north at least as far as Trondhjem Fjord (G. O. Sars). Further, it is common off the east coast of America between 41° 35' N. L. and 33° 42' N. L. in depths from 139 to 2516 fm. It is known from the western half of the Mediterranean; in the Atlantic it goes south to Montevideo and to 38° 5' S. B., 12° E. L. (Hansen), lastly 3 of the specimens taken by the "Challenger" south of Australia, at 47° 25' S. L., 130° 22' E. L., 2150 fm., belong to this species (Hansen).

At a number of the "Thor's" stations, namely, where 800 meters wire at least were used and where consequently the young-fish trawl was in a depth of at least 150—200 fm., specimens were taken which were adult or of considerable size; the largest was taken where 1500 to 1800 meters wire



were used, whereas those taken with 100 meters wire out are but small and far from mature. The structure of *S. arcticus*, the good state of preservation of the specimens taken by the "Ingolf" and the observations mentioned of the "Thor" show clearly that the species is not a bottom-form, but lives pelagically; large to very large specimens are however never taken near the surface, and the largest are not met with, at least as a rule, above a depth of about 250 fm. and they descend probably a good deal lower. — The specimen taken by the "Ingolf" at St. 140 has certainly been carried by the Gulf Stream into the Norwegian Sea and has been taken in the warmer layers, as the species undoubtedly does not live at the great depths with temperatures below 0° in the cold area.

Remarks. In my two papers on *Sergestes* mentioned above, I have dealt with the characteristics of this species, its distribution, the list of synonyms and likewise some of its larval stages, of which one has been described as *Sergestes Rinkii* Kr. The largest "Ingolf" specimen came from St. 9 and measures 55 mm.

#### 79. *Sergestes robustus* S. I. Smith.

- ! 1882. *Sergestes robustus* S. I. Smith, Bull. Mus. Comp. Zool., Vol. X, No. 1, p. 97, Pl. XVI, figs. 5—8 b.  
 1886. — — S. I. Smith, Rep. Comm. Fish & Fisher. for 1885, p. 697, Pl. XX, fig. 6.  
 1903. — — H. J. Hansen, Ann. and Mag. Nat. Hist., Ser. 7, Vol. XI, p. 480, figs. 6 & 7.  
 — — *inermis* H. J. Hansen, Ann. and Mag. Nat. Hist., Ser. 7, Vol. XI, p. 479, figs. 1—5 (barely half-grown specimen).

Occurrence. The "Ingolf" has not taken this species, but I have seen specimens from the following place.

South-West of the Færoes: 61° 08' N. L., 9° 46' W. L., 450 fm., 3 specimens taken by the "Michael Sars" (14/8 1902) and belonging to the Bergen Museum.

Distribution. It has been taken at 59° 49' N. L., 9° 46' W. L. by the "Thor", at 52° 41/2' N. L., 12° 27' W. L. (Hansen), in the Mediterranean (Hansen) and at a number of places off the east coast of North America between 41° 3/3' and 34° 28' N. L., in depths from 372 to 2574 fm. In the "Summary of the Deep-Sea Zoological Work of the Royal Indian Marine Survey Ship "Investigator" from 1884 to 1897", 1899, p. 30, Alcock writes concerning this species: "Off coasts of South-India and Ceylon 200—902 fathoms (common)"; but it is somewhat remarkable that he does not include it in his "Descriptive Catalogue of the Indian Deep-Sea Crust. Dec, Mac. and Anomura, 1901".

Remarks. The largest specimen from the locality mentioned was 60 mm. long when scarcely fully extended. The specimens agree very well with a specimen determined by Smith received from the U. S. Nat. Museum. The specimen from the "Thor" is 90 mm. long.

It appears from the list of synonyms, that I now consider the *S. inermis* founded by me in 1903 on a single not quite half-grown specimen as a young stage of *S. robustus* shortly after the larval period. I have come to this result from a study of a considerable material from the Monaco Museum, from E. Holt, and from the "Travailleur" and "Talisman". The reasons for my considering in 1903 the differences between an adult specimen of *S. robustus* and the specimen described as *S. inermis* to be specific differences, arose in the first place from the complete lack of transitional stages, and in the second from the fact that our Museum possesses some plump specimens, some of

which are in the *Mastigopus*-stages, others a little more advanced in development, and these I had taken to be the developmental stages of *S. robustus*, but according to my later observations these must belong to a species which is not known at any rate from the Atlantic.

In 1896 I founded *S. mediterraneus* on several specimens, in the largest of which the eyes were not yet black, while the others were *Mastigopus*-forms. In 1903 I included *S. mediterraneus* as a synonym under *S. dissimilis* Bate. It appears now that *S. dissimilis* is the *Mastigopus*-stage of *S. robustus*, so that intermediate stages have been described as *S. incertus* H. J. H. and as "the sub-adult stage" of *S. mediterraneus* H. J. H.

## II. Order: *Euphausiacea*.<sup>1</sup>

Within the region, the fauna of which is dealt with here, only 10 species in all have been taken of this Order<sup>2</sup>. As nearly all have been so well described and figured that they can be recognised with certainty, my notes are made relatively fairly short, the more so as I intend in the near future to publish a monograph of the whole Order based on an extremely large material. Analytical figures etc. will be much more suited to such a monograph and of more use there than if they were given here.

### 1. *Thysanopoda acutifrons* Holt & Tatt.

1905. *Thysanopoda pectinata* H. J. Hansen, Bull. Mus. Océan., Monaco, No. 30, p. 16, Fig. 12 (nec *T. pectinata* Ortmann).

1905. — *acutifrons* Holt & Tattersall, Rep. Sea and Inland Fisheries of Ireland, 1902—1903, Part II, App. No. IV, p. 102 and 134 (immature specimens).

1905. — — H. J. Hansen, Bull. Mus. Océan. Monaco, No. 42, p. 22.

! 1906. — — Holt & Tattersall, Fisheries, Ireland, Sc. Invest. 1904, V, p. 8, Pl. I.

Occurrence. The "Ingolf" took this large species in the trawl at 4 stations:

West of Iceland: St. 12: 64° 38' N. L., 32° 37' W. L., 1040 fm.; 1 spec.

— - - - 9: 64° 18' — 27° 00' — 295 —; 1 —

South-West of Iceland: St. 17: 62° 49' N. L., 26° 55' W. L., 745 fm.; 2 spec.

— - - - 83: 62° 25' — 28° 30' — 912 —; 2 —

<sup>1</sup> I see no reason for following Stebbing and call this order Thysanopodacea because the oldest of the genera has the corresponding name. If an author (in casu J. Boas) has set up a group as order — or family — given it a name and for that purpose used one of the genera of the group as basis, this name chosen by the author of the order or family has priority and should be maintained — unless the name of the genus in question must be dropped. Just as it is necessary (so far as it is possible within reasonable limits) to maintain the oldest names for species and genera, we must also go upon the same principle in retaining the oldest name for a family or order irrespective of how it was formed; in this way we have more stability than on any other method of procedure. It is another matter, that in forming a family it would be best to use immediately the oldest generic name as family name.

<sup>2</sup> Ortmann in his work on the Schizopoda of the Plankton-Expedition has stated that *Thysanopoda microphthalmia* G. O. S. is present from the Irminger Sea (at 60° N. L.). According to the form and equipment of the antennæ as shown in the author's figure his determination is incorrect, and I think he has had small specimens of *T. acutifrons* Holt & Tatt. which is not rare in these waters.

It was also taken by the "Thor" in 1903 and 1904 at the following stations:

West of Iceland:  $65^{\circ} 20' N. L.$ ,  $27^{\circ} 12\frac{1}{2}' W. L.$ , Young-fish trawl with 810 m. wire out (actual depth 720 m.).  
 — — —  $65^{\circ} 00' - 28^{\circ} 10' -$ , — — — 1000 m. — ( — — 1240 m.).  
 South of Iceland:  $62^{\circ} 10' N. L.$ ,  $19^{\circ} 36' W. L.$ , (depth 1900—2150 m.).  
 — — —  $61^{\circ} 34' - 19^{\circ} 05' -$ , — — — 1800 m. — (actual depth 2160 m.).  
 — — —  $61^{\circ} 30' - 17^{\circ} 08' -$ , — — — 1800 m.  
 South-West of the Færoes:  $61^{\circ} 15' N. L.$ ,  $9^{\circ} 35' W. L.$ ; (depth 900 m.).

**Distribution.** The species was founded in 1905 on specimens taken off the west coast of Ireland. It is mentioned above (footnote p. 84) that *Thysanopoda microphthalmia* Ortm. (nec G. O. Sars) from the Irminger Sea at  $60^{\circ} N. L.$  is probably the young of this species. It was taken by the "Thor" in 1905 at three places: far to the south-west of the Færoes, west of the Hebrides and south-west of Ireland, each time in the young-fish trawl with respectively 1200, 1500 and 1000 meters wire out. The Prince of Monaco has taken several specimens at two stations to the west of France, the most southerly being at  $46\frac{1}{4}^{\circ} N. L.$ ; the apparatus was sunk to 1490 and 3000 meters. It was never taken on any of the numerous occasions, when the vertical net was used from 100 fm. to the surface or the young-fish trawl in similar small depths within the area mentioned under occurrence and distribution. To judge from the "Thor's" results it is clearly not rare in intermediate layers in depths from about 200 down to 400 or 450 fm.

**Remarks.** In the synonymy list it will be seen, that (in April 1905) I first gave a preliminary description of this species under an erroneous determination, but that this error was corrected later (in July), and at the latter place I then gave a detailed description of adult and half-grown specimens, and also indicated the differences between it and the nearly related *T. distinguenda* H. J. H. An elaborate description with fine figures was published in 1906 by Holt & Tattersall. The largest specimen comes from St. 83 "Ingolf" and measures 43 mm.

## 2. *Meganyctiphanes norvegica* M. Sars.

1857. *Thysanopoda norvegica* M. Sars, Forh. Skand. Naturf. syvende Møde i Christiania 1856, p. 169.  
 1886. *Nyctiphanes* — Koelbel, Die oesterr. Polarst. Jan Mayen, p. 48, Taf. III, Fig. 7—10.  
 ! 1905. *Meganyctiphanes norvegica* Holt & Tattersall, Rep. Sea and Inland Fisheries of Ireland, 1902—1903, Part II, No. IV, p. 105 and 135, Pl. XVI.

**Occurrence.** The "Ingolf" took this species at numerous stations, most times in the trawl.

West of Iceland: St. 12:  $64^{\circ} 38' N. L.$ ,  $32^{\circ} 37' W. L.$ ; 1 spec.

— — — 9:  $64^{\circ} 18' - 27^{\circ} 00' -$  3 —

North of East Iceland: St. 126:  $67^{\circ} 19' N. L.$ ,  $15^{\circ} 52' W. L.$ ; 1 spec.

South of Jan Mayen: — 116:  $70^{\circ} 05' - 8^{\circ} 26' -$  1 —

— — — 112:  $67^{\circ} 57' - 6^{\circ} 44' -$  2 —

— — — 111:  $67^{\circ} 14' - 8^{\circ} 48' -$  1 —

North-East of Iceland: — 120:  $67^{\circ} 29' - 11^{\circ} 32' -$  3 —

East of Iceland: St. 101:  $66^{\circ} 23' N. L.$ ,  $12^{\circ} 05' W. L.$ ; 5 spec.

East of Iceland: St. 104: 66° 23' N. L., 7° 25' W. L.; 1 spec.

— - — - 105: 65° 34' — 7° 31' — 4 —

— - — - 106: 65° 34' — 8° 54' — 1 —

North-West of the Færoes: St. 3: 63° 35' N. L., 10° 24' W. L.; 1 spec.

North of the Færoes: St. 140: 63° 29' N. L., 6° 57' W. L.; 1 spec.

— - — - 138: 63° 26' — 7° 56' — 4 —

— - — - 141: 63° 22' — 6° 58' — 3 —

This species has never been taken in Baffin Bay, Davis Straits or waters south of Cape Farewell, nor to the north-west or north of Iceland except at the St. 126 mentioned: north of East Iceland. To the west, south-west and south of Iceland it was taken a number of times by the "Thor", which also found it in Rode Fjord on the east coast of Iceland; it has been taken by several investigators over the ridge between the Færoes and Iceland, and it is also common round the Færoes. It was taken by Ryder's expedition near Jan Mayen, from which it is also noted by Koelbel. Ohlin mentions it from two places at East Greenland, namely, 72° 42' N. L., 14° 49' W. L. and from a place a little further north off Kaiser Franz Joseph Fjord; Buchholz mentions it from Cape Wynn in 74° 30' N. L., 19° W. L.

**Distribution.** From the Færoes this species extends southwards along the British Isles (several observers), it also occurs in the Atlantic off France (Norman, Hansen, Holt & Tattersall), off Portugal (Norman), near the Gorringer Bank off Gibraltar (Hansen) and in the western part of the Mediterranean at least to Messina (Lo Bianco, Hansen). It was next taken in the Kattegat (Intern. Explor.), Skagerak (Metzger, Meinert), at Bohuslän (Goës), along the whole coast of Norway from Christiania Fjord to Vadsø in East Finmark (G. O. Sars), in the White Sea (Jarzynsky), in the Barents Sea (Breitfuss), at 75° N. L., 12° E. L. (Goës), lastly in the North Polar Sea by the "Fram" at ca. 81° N. L., 124° E. L. On the east coast of North America it has been found in the Gulf of St. Lawrence, at Nova Scotia, in Massachusetts Bay and as far to the south as ca. 40° N. L. Richters gives it with a query from the Bering Sea, but this determination is certainly extremely doubtful. Holt & Tattersall in 1905 and 1906 contribute to our knowledge of the distribution of the species in bathymetric regard; extremely important information on the same theme is given by S. I. Smith (1879) and G. H. Fowler (1905). I am not able to add to our knowledge in this regard, but may note, however, that the species was twice taken (only 1 spec. each time) in the so-called cylinder-net, an apparatus often towed near the surface by the "Ingolf" when steaming at its usual rate.

**Remarks.** I have arrived at the result that Holt & Tattersall's genus *Meganyctiphanes* ought to be accepted. The two authors pointed out an excellent generic difference in the female sex between this new genus and *Nyctiphanes* G. O. Sars; I can add that in the male the clasping organs of the first pair of pleopoda differ exceedingly from each other in the two genera.

### 3. *Rhoda inermis* Kroyer.

1846. *Thysanopoda inermis* Kroyer, Voy. en Scand., Crust., Pl. 7, figs. 2, a-t.

! 1882. *Euphausia inermis* G. O. Sars, Forh. Vid. Selsk. Christiania for 1882, Nr. 18, p. 51, Tab. I, Fig. 15.

Occurrence. The "Ingolf" has taken this species at 10 localities.

West Greenland: Godthaab Fjord, a small ebb pool; 1 specimen.

West of Iceland: St. 9: 64° 18' N. L., 27° 00' W. L., Trawl, 295 fm.; 1 spec.

North-East of Iceland: St. 121: 66° 59' N. L., 13° 11' W. L., Vertical net, 100—0 fm.; 3 spec.

East of Iceland: St. 103: 66° 23' N. L., 8° 52' W. L., Vertical net, 100—0 fm.; 2 spec.

— - — - 105: 65° 34' — 7° 31' — Trawl, 762 fm.; 1 spec.

— - — - 58: 64° 25' — 12° 09' — Plankton net, 100—0 fm.; 3 spec.

South-East of Iceland: St. 57: 63° 37' N. L., 13° 02' W. L., Trawl, 350 fm.; 1 spec.

— - — - 3: 63° 35' — 10° 24' — — 272 —; 2 —

North of the Færoes: St. 140: 63° 29' — 6° 57' — — 780 —; 1 —

— - — - 141: 63° 22' — 6° 58' — — 679 —; 1 —

In Malac. Groenl. this species is mentioned from West Greenland as taken at "Egedesminde and Ritenbenk" as also Godhavn; later it has been found at Jakobshavn (Traustedt); it thus goes northwards here at least to 69° 13' N. L., perhaps to 69° 44' N. L. A specimen is present from 59° N. L., 51° W. L., south-west from Cape Farewell. It was taken by the "Thor" and other investigators a number of times on the west, south and east of Iceland, and it appears likewise in the fjords, being taken in Skjálfandi on the north coast, in Mid Fjord, Seydis Fjord, Rode Fjord and Beru Fjord on the east coast. It was taken by the "Ingolf", as noted above, somewhat to the north of the Færoes, but has hitherto not been found to the west, east or south of these islands. It was taken by the 2<sup>nd</sup> Amdrup Expedition at Jan Mayen, from which it was already noted by Koelbel, also at ca. 73½° N. L., 4° W. L. and ca. 74⅓° N. L., 8½° W. L.; Ohlin gives it for several places along East Greenland between ca. 71½° and 73½° N. L., at the last-mentioned latitude in Kaiser Franz Joseph Fjord.

Distribution. The species has been taken at Shetland and twice at Scotland (Norman) going southward to ca. 55½° N. L. Further, it has been taken at several places in the North Sea and twice in the Channel's western end off the Scilly Islands and still more to the south towards the French coast (Gough). In the northern Kattegat it has been taken once (Meinert); it is extremely frequent "off the northern shores of Norway" (G. O. Sars), has been taken in the Kara Sea (Hansen), round about Spitzbergen both west and east side (Ohlin, Zimmer), as also at Franz Joseph Land (Stebbing). On the east coast of America it is known from the Gulf of St. Lawrence, Bay of Fundy and from there southward to Vineyard Sound (ca. 41⅓° N. L.) (S. I. Smith).

It is this species which according to G. O. Sars appears at Finnmark in such masses, that it forms the chief food of the blue whale and sometimes the food of the green cod. It was twice taken by the "Thor" in the young-fish trawl with respectively 15 and 40 meters line out; it was taken 3 times by the "Ingolf" in the vertical net from 100 to 0 fm. It appears from these 5 catches and from the literature, that the species often lives in the upper water-layers, but it is impossible at present to say whether it lives as a rule or always in the open sea at a distance of less than 100 fm. from the surface.

#### 4. *Rhoda Raschii* M. Sars.

1864. *Thysanopoda Raschii* M. Sars, Forh. i Vid. Selsk. Christiania for 1863, p. 83.

! 1882. *Euphausia Raschii* G. O. Sars, Forh. i Vid. Selsk. Christiania for 1882, No. 18, p. 51.

Occurrence. The "Ingolf" has only twice taken this species.

Davis Straits: St. 29: 65° 34' N. L., 54° 31' W. L., Trawl, 68 fm.; 2 spec.

— — - 28: 65° 14' — 55° 42' — Vertical net, 100—0 fm.; 1 spec.

On the west coast of Greenland it is known from Karajok Fjord, ca. 70° 20' N. L. (Vanhöffen) and in Malac. Groenl. I have mentioned various localities in the region from ca. 70° to 64 $\frac{1}{3}$ ' N. L. It was taken by the "Thor" a number of times at Iceland, namely, from the north-west coast in Patrik Fjord, from the north coast in Øfjord and Skjálfandi, from the east coast in Rode Fjord; it is present also from Seydis Fjord on the same coast, taken with the previous species by Hallas; Ostenfeld has it from a spot south-west of Iceland. In the East Greenland waters it has only once been taken, at ca. 74° 20' N. L., 15° W. L. (Buchholz).

Distribution. This species is further known from localities along both sides of Scotland (Norman). It was taken by the "Thor" several miles west of St. Kilda and twice in the Skagerak due south of Norway at 57° 52' N. L. It was founded on specimens from the Christiania Fjord, and Sars states that he has taken it "now and then" on the west coast of Norway, but does not give the northern limits.

We know at present no more of the distribution of this species, which is probably much greater. We may believe that the gaps are partly due to its having been sometimes confused with or not separated from the previous species.

### 5. *Thysanoëssa longicaudata* Krøyer.

1846. *Thysanopoda longicaudata* Krøyer, Voy. en Scand., Crust., Pl. 8, figs. 1, a—f.

1882. *Thysanoëssa tenera* G. O. Sars, Forh. Vid. Selsk., Christiania, p. 53, No. 18, Tab. I, Fig. 19—20.

! 1905. — *longicaudata* Holt & Tattersall, Rep. Sea and Inland fisheries of Ireland, 1902—1903, Part II, App. no. II, p. 107 & 138, Pl. XV.

Occurrence. The "Ingolf" has taken this species at numerous places:

Davis Straits: St. 28: 65° 14' N. L., 55° 42' W. L., Vertical net, 100—0 fm.; 5 spec.

— — - 37: 60° 17' — 54° 05' — Surface; 4 spec.

South-West of Greenland: St. 22: 58° 10' N. L., 48° 25' W. L., Vertical net, 200—0 fm.; 14 spec.

West of Iceland: St. 91: 64° 44' N. L., 31° 00' W. L., Plankton net, 100—0 fm.; 1 spec.

South-West of Iceland: St. 78: 60° 37' N. L., 27° 52' W. L., Plankton net, 100—0 fm.; 1 spec.

— - — - 39: 62° 00' — 22° 38' — — 100—0 —; 1 —

— - — - 68: 62° 06' — 22° 30' — Vertical net, 100—0 —; 12 —

South of Iceland: St. 63: 62° 40' N. L., 19° 05' W. L., Vertical net, 100—0 fm.; 11 spec.

— - — - 54: 63° 08' — 15° 40' — — 100—0 —; 10 —

South-East of Iceland: St. 57: 63° 17' N. L., 13° 02' W. L., Vertical net, 100—0 fm.; 15 spec.

— - — - 47: 61° 32' — 13° 40' — — 100—0 —; 2 —

South of Jan Mayen: St. 117: 69° 13' — 8° 23' — — 100—0 —; 1 —

North-East of Iceland: - 120: 67° 29' — 11° 32' — — 100—0 —; 9 —

— - — - 121: 66° 59' — 13° 11' — — 100—0 —; 5 —

East of Iceland: St. 101: 66° 23' N. L., 12° 05' W. L., Vertical net, 100—0 fm.; 1 spec.

— - — - 103: 66° 23' — 8° 52' — — 100—0 —; 13 —

— - — - 58: 64° 25' — 12° 09' — Plankton net, 100—0 —; 1 —

North of the Færoes: St. 138: 63° 26' N. L., 7° 56' W. L., Trawl, 471 fm.; 1 spec.

West of the Færoes: 63° 26' N. L., 10° 47' W. L., Surface; 2 spec.

The species is recorded from Karajok Fjord, ca. 70° 20' N. L., on the west coast of Greenland (Vanhöffen), from Davis Straits at 62° 06' N. L., 55° 56' W. L. (Norman) and from the waters south-west of Greenland at 59° N. L. 51° W. L. (Hansen). It has many times been taken by various expeditions, especially by the "Thor" in 1904, in the waters round Iceland as also to the west and south of the Færoes. It was taken at Jan Mayen by the 2<sup>nd</sup> Amdrup Expedition and at 73½° N. L., 4° W. L.; finally by the Ryder Expedition at East Greenland at 70° 22' N. L.

**Distribution.** The species is known from the Færoe Channel (Norman), Scotland (Norman), northern part of North Sea and west coast of Ireland (Holt & Tattersall). It is even noted from the Skager Rak (Intern. Explor.). G. O. Sars gives it from the west coast of Norway without indicating the southern limit, from Varanger Fjord and from 4 stations between Norway and Jan Mayen. It is also noted from Bear Island, from North-East Spitzbergen and north of Spitzbergen at 81° 20' N. L. (Zimmer); it was taken by the "Fram" much further to the north of Spitzbergen at 84—84½° N. L.; further, north-east of Franz Joseph Land at ca. 84½° N. L., 72° E. L., lastly at ca. 80° N. L., 124° E. L. (G. O. Sars). It was taken on the German Plankton-Expedition not only in the direct line from the north point of Scotland to Cape Farewell, but also several times on the line from 60° N. L., 42° W. L. to near the southernmost corner of Newfoundland (Ortmann).

It was taken three times by the Plankton-Expedition in the cylinder net, thus near the surface, by the "Ingolf" twice near the surface and 15 times in depths between 100 and 0 fm. As a result of these numerous catches we are justified in concluding that the species is found as a rule in the upper water layers, either near the surface or at any rate not deeper than 100 fm. under this.

According to Holt & Tattersall the specimens from the west coast of Ireland differ in various small details from the Norwegian specimens, but the differences are so small that the authors do not even set up the Irish form — which they think resembles greatly the Færoe specimens — as a variety. Their observations with regard to the bathymetric occurrence of the Irish specimens do not agree, however, with the conclusions I have considered myself justified in drawing above.

## 6. *Thysanoëssa neglecta* Kroyer.

1846. *Thysanopoda neglecta* Kroyer, Voy. en Scand., Crust., Pl. 7, figs. 3 a—d.

! 1882. *Thysanoëssa borealis* G. O. Sars, Forh. Vid. Selsk. Christiania for 1882, p. 52, No. 18, Tab. I, Fig. 16—18.

**Occurrence.** This species was not taken by the "Ingolf", but the Copenhagen Museum possesses some specimens from 4 places lying within our area.

South-West Iceland: Skagi, 20 fm., "Thor" 1903; 1 spec.

— : West of Geirfugleskjær, Young-fish trawl, with 100 m. wire out, "Thor" 1904;  
great quantity of specimens.

South-West Iceland:  $63^{\circ} 46' N.$ ,  $22^{\circ} 56' W.$ , 80 fm., "Thor" 1904; some spec.

East Iceland: Mid Fjord,  $40\frac{1}{2}$ —50 fm., "Diana"; 1 spec.

It is noted from West Greenland, Karajok Fjord in ca.  $70^{\circ} 20' N.$  (Vanhöffen), but the specimen I have mentioned in Malac. Groenl. as coming from  $59^{\circ} N.$ ,  $51^{\circ} W.$  has proved on renewed examination to be a young *Rhoda inermis*, in which the eyes were to a certain degree divided into two portions.

**Distribution.** The species is also known from the Færoe Channel, Shetland, northern part of the North Sea and East Scotland (several observers), Skager Rak (Internat. Explor.), also from the west coast of Ireland (Holt & Tattersall), but Caullery's statement that it occurs in the Bay of Biscay is probably due to an erroneous determination. It is further known from the Norwegian west coast and Varanger Fjord (G. O. Sars), from Horn Sound at Spitzbergen (Zimmer) and finally has been found on the north-east coast of North America at Eastport, Maine (Norman). — Norman and Ortmann bring in as synonymous *T. longipes* Brandt from the Sea of Ochotsk and Zimmer follows them hesitatingly. But judging from Brandt's observation that spines are present on the upper posterior margin of some of the abdominal segments this reference is quite incorrect; through the kindness of Dr. A. Birula I have been able to examine a couple of Brandt's (extremely mutilated) type-specimens, which show, as stated by him, well-developed dorsal processes.

**Remarks.** A renewed examination of the very old and badly preserved specimens investigated by Krøyer has shown, that most of these in which the eyes are preserved belong to this species (which was, however, first well described by Sars under the name *T. borealis*), whilst some specimens, to judge from the eyes, belong to *Rhoda inermis*. Krøyer's figure is poor, and he has never given a description, but as most of the specimens seen by him belong to *T. borealis* I still keep Krøyer's name for the species. If Krøyer's name has to be scored out, the species according to Norman's synonymy list must be called *T. aberdonensis* Sim.

## 7. *Nematoscelis megalops* G. O. Sars.

1883. *Nematoscelis megalops* G. O. Sars, Forh. Vid. Selsk. Christiania for 1883, no. 7, p. 27.

! 1885. — — G. O. Sars, Challenger Rep., Zoology, Vol. XIII, p. 127, Pl. XXIII, figs. 5—10, Pl. XXIV.

1905. — — H. J. Hansen, Bull. Mus. Océan. Monaco, No. 30, p. 27.

**Occurrence.** The "Ingolf" did not find this species but it has been taken by the "Thor" in 1904 at 4 localities:

South-West Iceland: West of Geirfugleskjær, Young-fish trawl with 100 m. wire out; 1 spec.

West of the Færoes:  $61^{\circ} 49' N.$ ,  $14^{\circ} 11' W.$ , — — — 800 m. — 1 —

South-West of the Færoes:  $61^{\circ} 21' N.$ ,  $10^{\circ} 59' W.$ , — — — 180 m. — 7 — (4 ♀, 3 ♂).

— — —  $61^{\circ} 15' — 9^{\circ} 35' —$  — — — 900 m. — 6 — (5 ♀, 1 ♂).

**Distribution.** This oceanic species is known from the North Sea (Intern. Explor.), from the east coasts of Scotland and North England (Norman), Irish Sea and west of Ireland (Holt & Tattersall); in 1905 the "Thor" found it several times to the west and north-west of the Hebrides. It has a



wide distribution in the Atlantic and western Mediterranean (several observers and Copenhagen Museum). The Plankton-Expedition has taken it in the Irminger Sea at 60° N. L. and east of Newfoundland; it was also taken off Nova Scotia, off France, at the Azores as also between Buenos Ayres, Tristan d'Acunha and Cape of Good Hope, whilst it is still unrecorded from the part of the Atlantic lying between ca. 28° N. L. and 37° S. L. The Copenhagen Museum also has it from two places in the southern part of the Indian Ocean: 40° 8' S. L., 52° E. L. and 40° 41' S. L., 85° 22' E. L. On the other hand I cannot accept Ortmann's note of its occurrence in the eastern Pacific as correct until further information is forthcoming.

The fact that the Copenhagen Museum has older material from no less than 12 widely separated places shows that the species comes up to the surface at any rate sometimes in the night, as the material has been collected for us by the captains of trading ships by means of a net towed after the ship. — G. H. Fowler (1905) gives a detailed report on the bathymetric distribution of the species in the Bay of Biscay; it was partly taken with an open vertical net, partly with a closing net and the results are "that the centre of distribution lay about 50 and 75 fathoms", that the species was also taken in 12 per cent. of the hauls near the surface and in the closing net as deep down as 750—500 fm. and in several intervening depths up to a haul in 150—50 fm.

Remarks. Males are much more rare than females. Sars has only seen females and neither Ortmann nor Holt & Tattersall say anything of males, which indicates that they have not taken specimens of this sex. As I have shown in the paper mentioned in the synonymy list, males differ in the most distinct manner from the females by lacking the very long and thin rostrum present in the latter. These males were taken by the "Thor", and neither in the older material of the Museum nor amongst over 20 specimens taken in 1904 by the Prince of Monaco are there any males.

#### 8. *Nematobrachion boopis* Calm.

! 1896. *Nematodactylus boopis* Calman, Trans. Roy. Irish. Acad., Vol. XXXI, p. 17, figs. 19—28.

1905. *Nematobrachion* — Calman, Rep. Sea and Inland Fisheries of Ireland, 1902—1903, Part II, App. 4, p. 153, Pl. XXVI.

Occurrence. The "Ingolf" did not take this beautiful form, but it was found by the "Thor" at the following 6 stations.

West of Iceland: 65° 00' N. L., 28° 10' W. L., Young-fish trawl with 1000 m. wire out; 5 spec. (depth 1240 m.).

South - — 61° 34' — 19° 05' — — — — 1800 m. — 2 — ( — 2160 m.).

— - — 62° 49' — 18° 46' — — — — 100 m. — 1 —

West of the Færoes: 61° 49' N. L., 14° 11' W. L., Young-fish trawl with 800 m. wire out; 3 spec.

South-West of the Færoes: 61° 15' N. L., 9° 35' W. L., Young-fish trawl with 900 m. wire out; 2 spec.

— - — 61° 08' — 9° 28' — — — — 820 m. — 1 —

Distribution. In 1905 the "Thor" took this species 3 times west and north-west of the Hebrides, further, south-west of Ireland and west of North France: 6 times in all and only with the young-fish trawl, but the length of line out varied from 300 to 1500 meters. It was known earlier from the waters west and south-west of Ireland (Calman, Holt & Tattersall), also from a place west of France and from a number of stations within the triangular area: Gorringer Bank, the Azores and

the Canary Isles (Hansen). Ortmann enumerates it from the waters near Hawaii, but to judge from a preliminary examination of material from the Pacific I am inclined to think that the animals from this ocean must be referred to a hitherto unnamed species. As it is not present in the older though very large material in the Copenhagen Museum, which was all taken practically near the surface in the Atlantic etc., I believe we may conclude that it as a rule does not approach the surface, but according to the "Thor's" catches it must sometimes occur in depths between ca. 75 and 25 fm.

#### 9. *Stylocheiron maximum* n. sp.

**Description.** While studying a rich material of "*Stylocheiron abbreviatum* G. O. Sars" from the Atlantic, the Indian Ocean and the Pacific, I discovered that it comprised two allied but very distinct species, one of which was *S. chelifera* Chun, while the other was either *S. abbreviatum* G. O. Sars or a species hitherto undescribed. *S. abbreviatum* has been established on "Challenger" specimens much less than half-grown; by the aid of Sars' figures and a couple of sketches kindly drawn by Dr. Calman for me from Sars' type I arrived at the opinion that *S. abbreviatum* is synonymous with *S. chelifera*; consequently it became necessary to give the new species a name, and *S. maximum* was chosen as appropriate. The discovery was made after the plates to this paper were finished; I will therefore only point out the two most conspicuous differences between *S. maximum* n. sp. and *S. abbreviatum* G. O. Sars (= *S. chelifera* Chun), postponing a more detailed account with figures to a subsequent occasion.

In adult and subadult specimens of *S. maximum* the eyes have the upper section slightly or at most a little smaller than the lower; besides, the fourth and fifth abdominal segments have no median dorsal tooth. In adult and subadult specimens of *S. abbreviatum* the eyes have their upper section much smaller than the lower, and the fourth and fifth abdominal segments each a conspicuous dorsal median tooth from the hind margin. In half-grown or still somewhat smaller specimens of *S. abbreviatum* the abdominal armature mentioned is feebly developed, and the upper section of the eyes is proportionately still smaller than in larger specimens; in small specimens of *S. maximum* the eyes have their upper section somewhat smaller as compared with the lower than in large specimens, but that section is yet conspicuously larger than in the other species.

*S. maximum* is even larger than *S. abbreviatum*; the specimen secured by the "Thor" is an adult male, measuring 23.5 mm. from the end of rostrum to the tip of telson.

**Occurrence.** The "Ingolf" has not taken this fine species, but it was brought home by the "Thor" in 1904.

West of the Faeroes: 61° 49' N. L., 14° 11' W. L., Young-fish trawl with 800 m. wire out; 1 spec.

**Distribution.** Here it may be briefly stated that I have seen specimens of *S. maximum* both from the Atlantic and from the Indian Ocean. I am inclined to think that at least some of my predecessors (for instance Ortmann) have mixed up *S. maximum* with the other species.

#### 10. *Stylocheiron longicorne* G. O. Sars.

1883. *Stylocheiron longicorne* G. O. Sars, Forh. Vid. Selsk. Christiania for 1883, no. 7, p. 32.

! 1885. — — G. O. Sars, Challenger Rep., Zool., Vol. XIII. p. 144, Pl. XXVII, fig. 5.

Occurrence. The "Ingolf" has not taken this species but it was twice found by the "Thor" in 1904.

South of Iceland:  $63^{\circ} 08' \text{ N. L.}$ ,  $21^{\circ} 30' \text{ W. L.}$ , Young-fish trawl with 250 m. wire out; 1 spec.

South-West of the Færoes:  $61^{\circ} 15' \text{ N. L.}$ ,  $9^{\circ} 35' \text{ W. L.}$ , Young-fish trawl with 1000 m. wire out; 2 spec.

Distribution. The species was twice taken to the west of the Hebrides by the "Thor"; it is frequent to the west and south-west of Ireland and in the Bay of Biscay (Holt & Tattersall), at the Azores and Canary Isles (Hansen), and in the Atlantic between  $42^{\circ} \text{ N. L.}$  and  $8^{\circ} \text{ S. L.}$  (Ortmann); it is not rare in the western Mediterranean (several observers) and was founded on a specimen taken south of the Cape of Good Hope. — As the species is quite lacking in the older material of the Copenhagen Museum it must occur rarely near the surface, though it has been taken there (Ortmann, Holt & Tattersall, etc.). Fowler (1905) gives a detailed account of its bathymetric occurrence in the Bay of Biscay; reference for details may be made to his paper.

Remarks. In the Monaco Bulletin No. 30 I have brought in *S. longicorne* as synonym to *S. Suhmii*, which last I thought was founded on not fully developed specimens. Later investigation of an immense material from various seas has shown me, that there are four nearly related species with long antennular peduncles, and therefore I must restore the name *S. longicorne*, but an account (with figures) of the four species is postponed to a paper in preparation.

### III. Order: *Mysidacea*.

Within the region the fauna of which is treated here 35 species of this Order have hitherto been found. But, whilst I have seen specimens from this region of all the species of Decapoda and Euphausiacea (with exception of a single doubtful form), there are no fewer than 4 species of the Mysidacea noted in the following pages which are mentioned exclusively on other authorities.

The limits of the region dealt with, sources of the material, synonymy etc. have been mentioned in the introduction to the Malacostraca, to which reference may be made.

#### A. Suborder Lophogastrida.

##### 1. *Gnathophausia zoëa* Will.-Suhm.

Pl. IV, figs. 3 a—3 e.

1875. *Gnathophausia zoëa* Willemoës-Suhm, Trans. Linn. Soc., Ser. 2, Vol. I, p. 32, Pl. IX, figs. 2—15.

! 1885. — — G. O. Sars, Challenger Rep., Zool., Vol. XIII, p. 44, Pl. VI, figs. 6—10.

— — willemoësi G. O. Sars, Challenger Rep., Zool., Vol. XIII, p. 38, Pl. V, figs. 1—6.

Occurrence. The "Ingolf" has taken this species 9 times.

Davis Straits: St. 25:  $63^{\circ} 30' \text{ N. L.}$ ,  $54^{\circ} 25' \text{ W. L.}$ , 582 fm.; 1 spec.

West of Iceland: St. 12:  $64^{\circ} 38' \text{ N. L.}$ ,  $32^{\circ} 37' \text{ W. L.}$ , 1040 fm.; 1 spec.

— - — - 11:  $64^{\circ} 34' - 31^{\circ} 12' - 1300 - 1 -$

West of Iceland: St. 90: 64° 45' N. L., 29° 06' W. L., 568 fm.; 1 spec.

South-West of Iceland: St. 17: 62° 49' N. L., 26° 55' W. L., 745 fm.; 1 spec.

— - — - 83: 62° 25' — 28° 30' — 912 —; 1 carapace.

— - — - 18: 61° 44' — 30° 29' — 1135 —; 1 spec.

South of Iceland: St. 41: 61° 39' N. L., 17° 10' W. L., 1245 fm.; 1 spec.

West of the Færoes: St. 42: 61° 41' N. L., 10° 17' W. L., 625 fm.; 1 spec.

Further, it has been taken four times within our region by the "Thor", three of the times in the waters south of Iceland, whilst the fourth place was at 65° 00' N. L., 28° 10' W. L., i. e. in the Irminger Sea west of Iceland, yet a little more northerly than St. 90 "Ingolf". It was taken all four times in the young-fish trawl and the amount of wire out varied between 1000 to 1800 meters, so that the real depth in which the specimens were taken varied from ca. 200 to at most 450 fm., whilst the depth of water at the stations varies from ca. 750 to over 1000 fm.

Distribution. The "Thor" has taken the species to the west of the Hebrides and west of Brittany (both times in the young-fish trawl and length of wire out respectively 1500 and 500 meters). It is noted from several places in the northern temperate and tropical Atlantic (Sars, Caullery, Holt & Tattersall, Hansen, Ortmann), from several places in the Indian Ocean (Alcock), south of Amboina, in the Banda Sea (G. O. Sars' locality for *G. Willemoësi*), lastly from some places in the Pacific Ocean (G. O. Sars, Faxon, Ortmann).

To judge from the "Thor's" catches the species does not live at the bottom but in intermediate layers. A specimen taken with 500 meters wire out, thus in a depth of at most ca. 125 fm., is quite small and this is also the case with a specimen taken with 1000 meters wire out, whilst among the specimens taken with 1500 meters wire out there is one somewhat more than half-grown, and among those taken with 1800 meters wire out there is a large specimen. It seems to be the same here as with *Sergestes arcticus* and *S. robustus*, that small specimens are often at least found nearer the surface than the larger and that the wholly developed specimens are always only met with in deeper layers.

Remarks. The largest specimen is a female with marsupium (from "Ingolf" Stat. 17) measuring 90 mm. from tip of rostrum to end of telson, whilst a male (taken by the "Thor") is 86 mm. long; Sars' largest specimen was only 70 mm. The spine at the distal extremity of the squama of the antennæ usually reaches a little beyond this, but in the large female scarcely to the extreme end of the squama; the outer edge of the spine is smooth without crenulations, and I have not seen such an equipment of small teeth as is shown by Sars' fig. 9. The rostrum and especially the posterior process of the carapace are relatively longer in small than in large specimens, which last form a transition to *G. Willemoësi* G. O. S. as figured l. c. Pl. V, figs. 1-2. I believe that Ortmann is right in cancelling *G. Willemoësi* as founded on large specimens of *G. zoëa*; I have examined Sars' specimens of his *G. Willemoësi* in the British Museum (Natural History) but notes on these specimens are postponed to a future publication.

On Pl. IV I have represented (figs. 3 b and 3 c) the distal portion of both mandibles seen from above and (fig. 3 a) the same portion of the left mandible seen from below, also the left maxillula (fig. 3 d) and maxilla (fig. 3 e). The two last figures especially I believe to be of some interest, as they show the segmental structure of these appendages and from which joints the various lobes arise,

whilst the figures given by G. O. Sars and Coutière are either defective or incorrect. The description to the plate furnishes sufficient explanation for the understanding of these figures.

## 2. *Eucopia unguiculata* Will.-Suhm.

1875. *Chalaraspis unguiculata* Willemoës-Suhm, Trans. Linn. Soc., Ser. 2, Vol. I, p. 37-40, Pl. VIII.

1885. *Eucopia australis* G. O. Sars, Challenger Rep., Zool., Vol. XIII, p. 55, Pls. IX-X.

Only in part, whilst *E. australis* Dana is another species.

! 1905. — *unguiculata* H. J. Hansen, Bull. Mus. Océan. Monaco, No. 42, p. 3.

Occurrence. The "Ingolf" has taken this species at 8 localities:

Davis Straits: St. 36: 61° 50' N. L., 56° 21' W. L., 1435 fm.; 1 spec.

South of Greenland: St. 21: 58° 01' N. L., 44° 45' W. L., 1330 fm.; 2½ spec.

West of Iceland: St. 12: 64° 38' N. L., 32° 37' W. L., 1040 fm.; ca. 20 spec.

— - — - 11: 64° 34' — 31° 12' — 1300 —; ½ spec.

South-West of Iceland: St. 17: 62° 49' N. L., 26° 55' W. L., 745 fm.; 3 spec.

— - — - 83: 62° 25' — 28° 30' — 912 —; 5 —

South of Iceland: St. 40: 62° 00' N. L., 21° 36' W. L., 835 fm.; 3 spec.

— - — - 49: 62° 07' — 15° 07' — 1120 —; ½ spec.

The species has been taken by the "Thor" three times to the south of Iceland and once south-west of the Færoes; for two of these the apparatus used was the young-fish trawl with 1800 meters wire out.

Distribution. As Sars has mixed together 3 species (*E. australis* Dana, *E. unguiculata* Will.-Suhm, and *E. sculpticauda* Faxon) in his description of *E. australis* and as later authors have not described the specimens examined by them I shall not follow the literature in speaking of the distribution but base my statements on my own observations. In 1905 it was twice taken by the "Thor" west of the Hebrides with 1500 meters wire out; I have seen numerous specimens from the western Mediterranean, from the Atlantic round the Azores and Canary Islands, from various places in the Indian Archipelago and from parts of the Pacific Ocean. To judge from the catches of the "Thor" and of G. H. Fowler (1905) this species is always pelagic in intermediate layers; it never comes near the surface.

Remarks. In the paper cited above I have indicated the characteristics of this species which distinguish it from the real *E. australis* Dana and from another large form as yet unnamed, and also discussed the synonymy: —

Adult specimens are as a rule only ca. 27-30 mm. in length, but two specimens of quite unusual size, viz. a female with marsupium 37 mm. long and a male 38 mm., occur amongst the considerable material from the "Ingolf" St. 12.

## 3. *Eucopia sculpticauda* Faxon.

1893. *Eucopia sculpticauda* Faxon, Bull. Mus. Comp. Zool., Vol. XXIV, p. 218.

! 1895. — — Faxon, Mem. Mus. Comp. Zool., Vol. XVIII, p. 219, Pl. K, figs. 2, 2 d,  
Pl. LIII, figs. 1-1 d.

1905. — — H. J. Hansen, Bull. Mus. Océan. Monaco, no. 30, p. 7, fig. 4.

Occurrence. The "Ingolf" has only once taken this species.

South-West of Iceland: St. 83: 62° 25' N. L., 28° 30' W. L., 912 fm.; 1 spec.

Distribution. The "Thor" took a specimen west of the Hebrides: 57° 46' N. L., 9° 55' W. L., young-fish trawl with 1500 meters wire out, thus at a depth of at most 350 to 400 fm. The species was next known according to the literature from the triangular area between Gibraltar, the Azores and the Canary Islands (Hansen), from the Indian Ocean (Alcock), the Fiji Islands (Ortmann), lastly the Galapagos Islands in the tropical Pacific, the Gulf of Panama and off Central America (Faxon). — It has thus an extensive distribution and must be referred to the mesoplankton like the previous species.

## B. Suborder Mysida.

### 4. *Hansenomysis Fyllæ* H. J. H.

Pl. IV, figs. 4 a—4 k.

1887. *Arctomysis Fyllæ* H. J. Hansen, Vid. Medd. Naturh. Foren. Kjobenhavn, for 1887, p. 210, Tab. VII, Fig. 5—5 l.

1893. *Hansenomysis Fyllæ* Stebbing, Intern. Scient. Series, Vol. 74, p. 268.

Occurrence. The "Ingolf" has twice taken this species.

Davis Straits: St. 35: 65° 16' N. L., 55° 05' W. L., 362 fm., temp. 3.6°; 2 spec.

— — — 27: 64° 54' — 55° 10' — 393 — — 3.8°; 1 —

Further, the "Fylla" has taken it in the Davis Straits, Admiral Wandel and the "Thor" near the Færoes; the localities are as follows:

Davis Straits: 65° 35' N. L., 54° 50' W. L., 80 fm., stones with Balani; 1 spec. (my type spec.).

South-West of the Færoes: 61° 15' N. L., 9° 35' W. L., 450—500 fm.; 10 spec.

— — — 61° 23' — 5° 04' — 255 fm., temp. 0°; 1 spec.

Distribution. This form is only known as yet from the localities mentioned.

Characteristics of the Species. The genus and species were founded on a single, adult, damaged female; as I now possess fairly good material, additional details to my previous description may be given here.

In well-preserved specimens the carapace shows a certain and sometimes very considerable solidity with characteristic, well-marked furrows as represented in fig. 4 a. The central two-thirds of the anterior margin seen from above (fig. 4 c) is flatly convex, seen from the side considerably bent upwards; each lateral portion forms a tolerably short wing, the anterior lateral margin of which is somewhat oblique, considerably convex above and reaching further forward than the central part of the carapace. Posteriorly the carapace is somewhat emarginate so that the hind upper part of the fifth thoracic segment is uncovered; the sixth and seventh thoracic segments (fig. 4 a; VI, VII) are completely uncovered and firmly chitinised. The head projects very considerably forwards in front of the carapace; seen from the side its upper profile is very concave, so that the front end projects strongly forwards and upwards (fig. 4 a); seen from above the front end is considerably convex (fig. 4 c).

The eyes (o) are seen along the hinder portion of the lateral margins of the projecting part of the head. Each eye is a short plate, ca. 3 times as broad as long with the concave terminal margin looking obliquely forwards and outwards, and its posterior corner especially is much produced outwards (fig. 4 a); any trace of visual elements is quite lacking. — The peduncle of the antennulæ is a little shorter and distally a trifle thicker in the males than in the females; in the female (fig. 4 c) the three joints decrease slightly in length from behind forwards whilst in the male (fig. 4 b) the two distal joints are of equal length. In both sexes the outer flagellum seems but slightly longer than the inner one (I have not seen adult specimens with both flagella quite unbroken), and both are fairly short; in the female both flagella are almost of equal thickness, whilst in the male (fig. 4 b) the 13 proximal joints of the upper, outer flagellum form an extremely thickened portion the distal third of which, however, tapers evenly towards the end. — The squama is between 5 and 6 times as long as broad, tapering outwards with rounded apex, with setæ along both margins and further 5 to 6 obvious strong spines distributed along the outer margin. — The telson (fig. 4 i) reaches very little beyond the inner ramus of the uropods; its lateral margins are almost parallel for barely two-thirds of the length and then the breadth narrows abruptly, each margin being divided into 4 sections of about equal length by 3 small notches each of which has a thick and very long spine; the end which is thus short is flatly rounded and provided with a pair of thick long spines separated by a shorter spine. In front of the second of the very long lateral spines there is a short spine, between the second and third long spines 4–6 smaller spines increasing gradually in length backwards, between the third long lateral spine and the long terminal spine 6 shorter spines increasing gradually in length backwards (fig. 4 k)<sup>1</sup>. — The pleopods in the female are as usual unbranched, but they increase greatly in length from before backwards, so that the fourth pair is a little longer than the fifth segment, the fifth pair however but little longer than the sixth segment, which is not much shorter than the two previous segments taken together. In the male all the pleopoda are of about equal length (figs. 4 d–4 h), but a little shorter than usual in forms of this suborder and they differ considerably in several points from the usual type. The peduncle increases a little in length from before backwards; the outer ramus is almost similar in all pairs, consisting of a long joint divided obliquely at a little distance from its base and ca. 8 (on the fifth pair) short joints; this portion has two longitudinal rows of fairly short but strong, non-plumose setæ. The inner ramus consists on the first pair (fig. 4 d) of only a single oblong joint. On the second to the fourth pairs the inner ramus is well-developed and increases a little in length backwards, being on the second pair (fig. 4 e) a little shorter, on the fourth pair (fig. 4 g) a little longer, than the outer ramus; in all three pairs the inner ramus consists of a long, unjointed basal portion and a distal portion divided into 7 or 8 short joints with similar setæ as on the outer ramus, but the proximal unjointed portion increases in length from before backwards and on the second pair is a little shorter, on the fourth pair somewhat longer, than the jointed distal portion. On the fifth pair (fig. 4 h) the unjointed portion is, however, a little longer than the whole outer ramus and a jointed portion is lacking. Further, the setigerous equipment on the unjointed portion of the inner ramus offers some interest, as almost all the setæ are tolerably transparent and

<sup>1</sup> This description of the telson has been based on the males as the telson in all my adult females was greatly mutilated. There is however scarcely any sexual difference in this organ.

comparatively speaking not thin, and are divided into several joints; also the very long setæ on the outer margins of the first to the fourth pair and the apical and subapical setæ on the fifth pair are placed on protuberances as on a kind of basal support. The characteristic distribution of the setæ and the relative position of the setigerous groups on the inner branches can be seen from the figures.

The females with marsupium measure 16–17 mm., the males 13 mm. in length.

*Family Petalophthalmida.* — In 1887 I founded this species under the name *Arctomysis Fyllæ* n. gen., n. sp. and wrote: "I believe that my new genus should be placed near the genus *Petalophthalmus* Will.-Suhm and that these two genera should form together a family by themselves within the order of the Mysidæ". In 1893 Stebbing gave it the name *Hansenomysis*, as the generic name used by me had been applied by Czerniavsky to a genus which was, however, quite unmaintainable (see below p. 102). In 1895 Faxon described in detail two genera founded by him in 1893 and thus writes: "*Petalophthalmus*, *Scolophthalmus*, *Hansenomysis*, and *Ceratomysis*, form a natural group of genera characterized by the development of seven pairs of incubatory lamellæ in the female (the anterior pair sometimes rudimentary), the absence of an exopod from the maxillipeds, the outgrowth of a large, porrect lobe from the inner margin of the merus of the gnathopods, and the imperfect development of the carapace, which leaves the last two segments of the cephalo-thorax free". Seven pairs of marsupial lamellæ are also found, as Faxon also remarks, in *Borcomysis*, but in no other genus of this suborder, where only three or fewer pairs of lamellæ are met with; on the other hand, the other characters summed up by Faxon are exclusively peculiar to the genera named, which I therefore unite into one family with the title as above<sup>1</sup>. This family further differs from all other genera of the suborder by the great difference existing between the terminal portion of the second to the fourth pair of thoracic legs and that of the fifth to the seventh pair, the last three pairs having the seventh joint and the claw fused together to form a long claw, whilst the same parts in the second to the fourth pair are very short and concealed in setæ. — The genera of the family further show great agreement with one another in several respects, such as, the carapace has well-marked furrows on it, the outer ramus of the uropods has a very distinct articulation at a little distance from the tip, etc.

Of the four genera *Petalophthalmus* and *Ceratomysis* have a long, good-sized process from the fourth articulation of the maxillipeds and this process is lacking in the other two genera. *Petalophthalmus* differs greatly also from the other three genera by the mandibular palp being very much elongated and by the unusually reduced and characteristic pleopoda in the male. I mention this last character as I am acquainted with the hitherto undescribed male of *Ceratomysis*, and *Scolophthalmus* is so nearly related to *Hansenomysis* that the pleopods are probably almost the same in these two genera. Further, the outer branch of the antennules in the male is not thickened in *Petalophthalmus*, whereas it is greatly thickened in *Ceratomysis* and as in *Hansenomysis* and presumably in *Scoloph-*

<sup>1</sup> In the above-named paper (Fisheries, Ireland, Sci. Invest. 1904, V., [1906]) Holt & Tattersall established this family. and their diagnosis comprises the major part of the features mentioned here by me. But when I received their paper this portion of my manuscript was already translated; for that and other reasons I prefer to alter nothing in my own text, only referring the reader to their paper. I will add, that the family must, of course, bear the name of the authors, as their paper has been published years before mine, and that their diagnosis contains a correct character not pointed out by me, viz. "Inner uropods without otocyst".



*thalmus*. *Scolophthalmus* stands near to *Hansenomysis* and seems essentially only to differ from this in that the stalk of the antennules is considerably elongated and the carapace produced into a relatively large rostrum.

### 5. *Boreomysis scyphops* G. O. Sars.

1879. *Boreomysis scyphops* G. O. Sars, Archiv f. Math. og Naturvid., B. IV, p. 429.

! 1885. — — G. O. Sars, Norske Nordh.-Exp., Crust. I, p. 56, Pl. VI.

Occurrence. The "Ingolf" has taken this species at 13 stations.

South of Jan Mayen: St. 113: 69° 31' N. L., 7° 06' W. L., 1309 fm., temp. ÷ 10°; 17 spec.

— - — - 117: 69° 13' — 8° 23' — 1003 — — ÷ 10°; 33 —

— - — - 118: 68° 27' — 8° 20' — 1060 — — ÷ 10°; 6 —

North of East Iceland: St. 125: 68° 08' — 16° 02' — 729 — — ÷ 08°; 1 —

North-East of Iceland: - 112: 67° 57' — 6° 44' — 1267 — — ÷ 11°; 35 —

— - — - 119: 67° 53' — 10° 19' — 1010 — — ÷ 10°; 5 —

— - — - 120: 67° 29' — 11° 32' — 885 — — ÷ 10°; 15 —

— - — - 111: 67° 14' — 8° 48' — 860 — — ÷ 09°; 9 —

— - — - 110: 66° 44' — 11° 23' — 781 — — ÷ 08°; 1 —

East of North Iceland: - 102: 66° 23' — 10° 26' — 750 — — ÷ 09°; 1 —

— - — - 104: 66° 23' — 7° 25' — 957 — — ÷ 11°; 60 —

— - — - 105: 65° 34' — 7° 31' — 762 — — ÷ 08°; 3 —

North of the Færoes: - 140: 63° 29' — 6° 57' — 780 — — ÷ 09°; 5 —

One specimen was taken by the "Thor" east of Iceland: 66° 19' N. L., 10° 45' W. L., 760 fm. Ohlin notes it from a place between East Greenland and Jan Mayen: 72° 42' N. L., 14° 49' W. L., 1053 fm. — It is easily seen that all the localities lie in the cold area north of the Færoes to the east and north-east of Iceland, also as far north as Jan Mayen and between this island and East Greenland; the depth varied between ca. 760 to 1309 fm., the bottom-temperature between ÷ 08° and ÷ 11°.

Distribution. G. O. Sars founded the species on some specimens taken in the waters N. W. of Finnmark: 71° 59' N. L., 11° 14' E. L., 1110 fm., temp. ÷ 13°. Ohlin gives it from two places considerably further north, namely, 77° 52' N. L., 3° 5' W. L., 1455 fm., temp. ÷ 14° and 78° 19' N. L., 8° 41' E. L., 1430 fm., temp. ÷ 14°. In his work on the Schizopods of the "Challenger", Sars refers a number of specimens taken at 3 stations in the southern Ocean to this species; the stations lie between 46° 16' and 53° 55' S. L., the depth varied from 1600 to 1950 fm. and the bottom-temperature was over 0°. Being no believer in bipolarity I have always supposed that the last-named specimens belong to a different species; besides *B. scyphops* is not known from any place between the Northern Ocean and the Antarctic Sea, and the bottom-temperature is below zero at all arctic stations, above zero in the antarctic localities. In June 1907 I went to London taking with me some specimens of my *B. scyphops* for comparison with the antarctic specimens, and the result arrived at will be given presently.

Remarks. The largest of my numerous specimens, a female with marsupium, is 60 mm. from the tip of the rostrum to the end of the telson. Sars gives 70 mm., but does not state how the measurement was taken; the largest "Challenger" specimens from the Antarctic Sea is given by him

as 85 mm. measured from the end of the antennal squama to the tip of the telson — not a fortunately chosen measurement. In the British Museum (Natural History) three antarctic specimens determined by Sars are found; the specimen marked "type", a female with the marsupium scarcely fully developed, measures 54 mm. from the front end of the rostrum to the tip of the telson; the largest of the two other specimens, a female with the marsupium only half developed, measures 58 mm.; the third specimen is 49 mm. These southern specimens belong to a species very closely allied to, but not identical with, *B. scyphops*, because there is a constant and very pronounced difference in the shape of the eye-cups between the two forms. In the antarctic form, for which I propose the name *B. distinguenda* n. sp., the eye-cup (fig. 2 a) is rather oblong, the proportion between height and length (the eye-stalk omitted) being about as 17:25, and the protruding rim is broad, especially at the limit between the

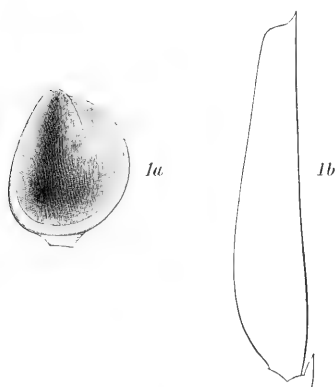


Fig. 1. *Boreomysis scyphops* G. O. Sars,  
1 a. right eye,  $\times 7$ ; 1 b. right antennal  
squama, slightly more than  $\times 6$ .



Fig. 2. *Boreomysis distinguenda* n. sp.  
2 a. right eye,  $\times 7$ ; 2 b. right antennal  
squama,  $\times 6\frac{2}{3}$ .

upper and the posterior margin. In *B. scyphops* the eye-cup is relatively flatter and higher (fig. 1 a) the proportion between height and length being about as 21:26, the protruding rim is narrow, frequently even narrower than shown in the figure, and the distal upper lobe at the front margin is often rudimentary. A comparison between fig. 1 a and fig. 2 a will convey a good idea of the difference in outline and excavation of the eye-cups in the two species. Finally the antennal squama is slightly narrower in proportion to length in *B. scyphops* than in *B. distinguenda*.

It may be added that I have a proportionately large material of *Boreomysis* from the Arctic Seas, the Atlantic, the Indian Ocean and the Pacific; the material comprises nearly all hitherto established and several undescribed species. Some species are closely allied, and a thorough study is needed in order to avoid mistakes.

#### 6. *Boreomysis tridens* G. O. Sars.

1870. *Boreomysis tridens* G. O. Sars, Christiania Vid. Selsk. Forhandl. for 1869, p. 153.  
! 1879. — — Monogr. Norges Mysider, III, p. 17, Tab. XIV.

Occurrence. The "Ingolf" has taken this species at 5 stations.

Davis Straits: St. 35: 65° 16' N. L., 55° 05' W. L., 362 fm., temp. 3·6°; 18 spec.

— — — 27: 64° 54' — 55° 10' — 393 — — 3·8°; 11 —

— — — 25: 63° 30' — 54° 25' — 582 — — 3·3°; 6 —

West of Iceland: St. 97: 65° 28' N. L., 27° 39' W. L., 450 fm., temp. 5·5°; 1 spec.

South-West of Iceland: St. 81: 61° 44' N. L., 27° 00' W. L., 485 fm., temp. 6·1°; 4 spec.

Further, the "Thor" has taken it twice.

South-West of the Færoes: 61° 15' N. L., 9° 35' W. L., 450—500 fm.; 1 spec.

— — — 61° 08' — 9° 28' — 434 fm.; 15 spec.

It appears that the depth was from 362 to 582 fm. and the bottom-temperature considerably over 0°. The species seems to live near the bottom.

Distribution. Sars has taken the species at several stations in the West Fjord at Lofoten in depths from 300—400 fm. According to Sars, Norman and Nordgaard it has been taken in several Norwegian fjords from 63<sup>2</sup>/<sub>3</sub>° to 69<sup>2</sup>/<sub>3</sub>° N. L.; the lowest depth was 200 fm. Finally it was three times taken off the west coast of Ireland in 382, 454 and 500 fm. (Holt & Tattersall).

Remarks. Sars has only described the female. Amongst the considerable material in my possession are several males; one of the largest (from "Ingolf" St. 35) measures 31 mm. from tip of rostrum to end of telson. The abdominal legs in the male are essentially as in the same sex of the two following species.

#### 7. *Boreomysis nobilis* G. O. Sars.

1879. *Boreomysis nobilis* G. O. Sars, Arch. Math. og Naturv., B. IV, p. 428.

! 1885. — — G. O. Sars, Norske Nordhavs-Exp., Crust., p. 54, Pl. V, figs. 22—28.

1901. — — A. Ohlin, Bih. K. Sv. Vet.-Akad. Handl., B. 27, Afd. IV, No. 8, p. 70, Fig. 3.

Occurrence. The "Ingolf" took this species at the following 6 stations.

South of Jan Mayen: St. 116: 70° 05' N. L., 8° 26' W. L., 371 fm., temp. ÷ 0·4°; 1 spec.

East of North Iceland: — 101: 66° 23' — 12° 05' — 537 — — ÷ 0·7°; 1 —

— — — 102: 66° 23' — 10° 26' — 750 — — ÷ 0·9°; 1 —

North of the Færoes: — 139: 63° 36' — 7° 30' — 702 — — ÷ 0·6°; 1 —

— — — 138: 63° 26' — 7° 56' — 471 — — ÷ 0·6°; ca. 50 spec.

— — — 141: 63° 22' — 6° 58' — 679 — — ÷ 0·6°; 1 spec.

Further, it has been taken at the following localities, two of which are on Ohlin's authority, a third on Vanhöffen's.

Baffin Bay: 75° 26' N. L., 67° 27' W. L., 260 fm.; 2 spec. (See Malac. Groenl.).

— — : Lille Karajok Fjord, ca. 70° 20' N. L., 100 fm. (test. Vanhöffen).

— — : 69° 15' N. L., 52° 55' W. L., 265 fm.; 5 spec. (See Malac. Groenl.).

— — : Jakobshavn, Traustedt; many specimens.

North-West of Iceland: 65° 57' N. L., 27° 00' W. L., 336 fm., temp. 0°, Wandel; 1 spec.

North of Iceland: 67° 19' N. L., 17° 55' W. L., 436 fm., Young-fish trawl with 800 met. wire out "Thor" 1904; 2 spec.

East Greenland: Cape Brewster:  $70^{\circ} 09' N. L.$ ,  $22^{\circ} 02' W. L.$ , 250 fm., 2. Amdrup Exp.; 1 spec.

— — Off Kaiser Franz Joseph Fjord, 132 fm.; several spec. (test. Ohlin).

— — Entrance of — — 106—158 fm.; 3 spec. (test. Ohlin).

North of the Færoes:  $63^{\circ} 10' N. L.$ ,  $7^{\circ} 31' W. L.$ , 532 fm., Young-fish trawl with 800 met. wire out, "Thor" 1904; 1 spec.

South-East of the Færoes:  $61^{\circ} 23' N. L.$ ,  $4^{\circ} 21' W. L.$ , 505 fm., temp.  $\div 0.4^{\circ}$ , Wandel; 1 spec.

We see that wherever the bottom-temperature was given, it was  $0^{\circ}$  or as a rule under  $0^{\circ}$ ; the probability is that the 4 localities in Baffin Bay had the same temperature and for all the others it is certain that the bottom-temperature was negative. But the "Thor" has twice taken it in the young-fish trawl at a depth scarcely over 200 fm., whilst the waters at both places were more than twice this depth; whether these specimens were taken in water under or yet very near  $0^{\circ}$  cannot be determined. Future investigations must settle, however, whether the species belongs as a rule to the mesoplankton or lives near the bottom.

Distribution. Outside the area specially dealt with here, only the full-grown male on which Sars founded the species has hitherto been taken and came from  $79^{\circ} 59' N. L.$ ,  $5^{\circ} 40' E. L.$ , 459 fm., temp.  $\div 1^{\circ}$ .

Remarks. The largest specimen, an adult male from "Ingolf" Stat. 116, is 51 mm. from tip of rostrum to end of telson; the female is somewhat smaller, one of my largest specimens (from "Ingolf" Stat. 138) being only 42.5 mm. long; Ohlin gives the length of his largest female from East Greenland as 49 mm.

### 8. *Boreomysis arctica* Kroyer.

1861. *Mysis arctica* Kroyer, Naturh. Tidsskr., 3. R., B. I, p. 34, Tab. I, Fig. 5 a—f.

! 1879. *Boreomysis arctica* G. O. Sars, Monogr. Norg. Mysider, III, p. 10, Tab. XI—XIII.

Occurrence. The "Ingolf" has not taken this species, but it is present from other sources. Kroyer founded it on a specimen from West Greenland, but the locality is unknown; it was taken later on the same coast in Lille Karajok Fjord, ca.  $70^{\circ} 20' N. L.$ , 100 fm. by Dr. E. Vanhöffen. In 1904 the "Thor" took a number of specimens south-west of the Færoes:  $61^{\circ} 15' N. L.$ ,  $9^{\circ} 35' W. L.$ , 450—500 fm.

Distribution. The species is also known from Norway, where it was taken by G. O. Sars in Christiania Fjord, Hardanger Fjord and at Lofoten; concerning its bathymetric occurrence he writes that he had never met it "before at a depth of 200 fm. whereas in Hardanger Fjord it goes down right to 400 fm." Nordgaard notes it from West Finnmark and says: "There can, however, hardly be any room for doubt that it has planktonic habits, as it has several times been taken by townetting". It has also been taken in the Skagerak (Internat. Explor.) and west of Ireland at depths of 181 to 382 fm. (Holt & Tattersall), at the east coast of America at ca.  $40^{\circ} N. L.$ , 500 fm. (S. I. Smith), lastly in the western Mediterranean near Capri (Lo Bianco).

Remarks. Czerniavsky is doubly incorrect in basing a new genus, *Arctomysis*, on this species of Kroyer and in considering it as different from Sars' form. The thoracic "tarsi" have in reality, as Sars states, only 3 joints, but there are further more or less distinct traces of other two similar "false" articulations, and it is these which Kroyer indicated as really existing articulations. The generic

character of *Arctomysis* thus falls to the ground; the species of Krøyer and Sars are identical, which has also been accepted by Sars himself and by several other observers.

#### 9. *Boreomysis microps* G. O. Sars.

1883. *Boreomysis microps* G. O. Sars, Forh. Vid. Selsk. Christiania for 1883, No. 7, p. 35.

1885. — — G. O. Sars, Challenger Rep., Zool., Vol. XIII, p. 185, Pl. XXXIII, figs. 7—10.

1905. — subpellucida H. J. Hansen, Bull. Mus. Océan. Monaco, No. 30, p. 8, figs. 5—8.

Occurrence. The "Ingolf" has not found this species but it was taken by the "Thor" in 1904 at the following localities.

West of Iceland: 65° 00' N. L., 28° 10' W. L., 1240 m., Young-fish trawl, 1000 m. wire out; many spec.

— — — 65° 20' — 27° 12½' — 740 m., — — 810 m. — 6 spec.

— — — 65° 27' — 27° 10½' — 763 m., — — 800 m. — 2 —

South of — 61° 34' — 19° 05' — 2160 m., — — 1800 m. — 7 —

— — — 61° 30' — 17° 08' — ? — — 1800 m. — many spec.

— — — 62° 47' — 15° 03' — 1950 m., — — 1000 m. — 1 spec.

South-West of the Færoes: 61° 08' N. L., 9° 28' W. L., 820 m., Young-fish trawl, at bottom; 1 spec.

Distribution. The species was founded on a specimen taken south of Nova Scotia: 62° 8' N. L., 63° 39' W. L., 1250 fm. The "Thor" has taken it 3 times in the waters west of the Hebrides with the young-fish trawl, 1500 meters wire out. It was next taken to the west of Ireland in townets from 1150 to 0 fm. (Holt & Tattersall), also at several places south of the Azores in the vertical net sunk to 1640—1770 fm., once to 820 fm. (Hansen). The species thus belongs to the mesoplankton and as a rule is scarcely met with before ca. 200 fm. down, but how deep it penetrates is naturally unknown.

Remarks. In my paper cited, I founded a new species *B. subpellucida*, as the numerous specimens I had differed considerably from Sars' descriptions and figures in some characteristics. Thus Sars has neither mentioned nor figured the very distinct process on the upper side of the eye-stalks close behind the cornea, also the proximal part of the telson is considerably narrower in relation to its length than in my specimens. Later Mr. Holt examined Sars' type preserved in the British Museum and writes (in 1906): "The fact is that in so far as the diagnosis of *B. microps* differs from that of *B. subpellucida*, the former is erroneous"; consequently he withdraws *B. subpellucida* as a synonym to *B. microps*. My own examination of Sars' type in 1906 gave the same result.

A large female with marsupium (from 65° N. L.) measures 20 mm. from tip of rostrum to end of telson; a male from 61½° N. L. is 19½ mm. long.

#### 10. *Longithorax fuscus* n. sp.

Pl. V. figs. 1 a—1 o.

Description of the Genus. As the description of the genus is founded on a single somewhat damaged female, in which the marsupium is not fully developed, this diagnosis is not quite complete<sup>1</sup>.

<sup>1</sup> I had established a new genus on the present form before Dr. G. Illig's preliminary note on the "Valdivia" Mysidacea was published. Consequently I accepted the generic name *Longithorax* proposed by him for an allied species, but I did not alter anything in the descriptions of the genus or the species.

The genus is obviously different from all other hitherto known Mysidacea in having the last thoracic segment (at least in the female) very elongated; dorsally it is not much shorter than the two first abdominal segments taken together whilst ventrally it is even considerably longer than dorsally; the seventh pair of thoracic legs are inserted at its front margin. The carapace is tolerably short, deeply incised posteriorly, so that the central portion of the penultimate thoracic segment is uncovered; its lateral wings reach a little beyond the front margin of the last segment. The left mandible (fig. 1 f) has the *pars incisiva* well developed, its *lacinia mobilis* has a large and strong *cusps* incised at the end, whilst behind this there is only a pair of weaker setæ; the *pars molaris* is slightly marked, small and weakly developed; the whole margin from the base of the *cusps* to the posterior end of the *pars molaris* is furnished with fine hairs. The lobe of the second joint of the maxillæ (fig. 1 h) is rounded, with no protuberance, that on the third joint is cleft, the last joint of the palp unusually long, and the greater part of the under side of this joint and of the lobes are densely covered with hairs. The second joint of the maxillipeds (fig. 1 i) is long with a small but distinct lobe, the third very short with a similar lobe, the 4 following joints with inconsiderable difference in length but decreasing outwards in breadth, so that the two last are fairly narrow. The first thoracic leg (fig. 1 k) has the second joint in the form of a large plate as broad as long; the rest of the leg is slender, the sixth joint somewhat shorter than the fifth, the claw well-developed. The other thoracic legs, which increase somewhat in length from before backwards, are very slender (fig. 1 m) except as regards the second joint, which is a large and broad plate; the sixth joint is considerably longer than the fifth without oblique articulation, but its shorter distal part is separated as a distinct joint by a well-developed, vertical articulation; the seventh joint and the claw are well-developed. The exopodite on the thoracic legs (fig. 1 l) has the subbasal joint large and unusually broad, plate-like (the exopod of the maxillipeds was broken off). Antennæ and tail-fan almost as in *Meterythrops*.

It will be seen from these characteristics, that the genus must be placed in the *Erythrops*-group, showing in a number of characters considerable agreement with *Meterythrops*, but there are differences more or less in all the appendages described above in detail.

**Description of the Species.** As there is only the mentioned incompletely developed specimen to hand, only the carapace, eyes, antennal scale and caudal process will be described here, the other characters can be learnt from the description of the genus and the figures.

The front end of the carapace, seen from above (fig. 1 c), is triangular, with median angle a little over 90°, but the very tip is produced in a very small process which is somewhat smaller than the process on the eye-stalks. The eyes are yellowish and moderately small; seen from the side (fig. 1 b) they look downwards a little and occupy the end of the eye-stalks in a flattened arch; seen from above (fig. 1 c) they appear as a narrow band at the end of the stalk and are no broader than this; above and close behind the eye at its centre the stalk has a protruding, distally rounded process which projects forward over the eye. The squama (fig. 1 d) is moderately small, three times as long as broad; its smooth outer margin is but little more than twice as long as the breadth, whilst the setigerous terminal margin is very oblique and the distal outer corner has a short tooth. The outer ramus of the uropoda (fig. 1 n) is defective, but nevertheless much longer than the inner branch, and to judge from the serrulation the margins have undoubtedly been covered with setæ over along

almost their whole length; the sense organ in the inner ramus is moderately small, but distinct. The telson has almost the same form as in *Parerythrops abyssicola* G. O. S.; it is moderately short, reaching scarcely behind the centre of the inner ramus. The lateral margins are convex along the proximal third of their length, distinctly concave and converging considerably backwards in their distal two-thirds; the transverse terminal margin (fig. 10) is very short with 4 very long spines, the outer pair of which is shorter and a little thinner than the inner (one spine of the inner pair is lost and the other also for a smaller or greater part broken off); the distal part of the lateral margin has 5 small spines. (The hindmost pair of marsupial lamellæ are fairly small, evidently not fully developed; the lamellæ of the sixth pair of thoracic legs are very small, and there are none from the fifth pair). — Length from rostrum to end of telson 17.5 mm.

The specimen preserved in formalin was of a dark greyish brown colour when received.

Locality. The specimen described was taken by the "Thor" on July 11<sup>th</sup> 1904 at the following place:

South of Iceland: 61° 30' N. L., 17° 08' W. L., Young-fish trawl with 1800 meters wire out.

Distribution. According to a kind letter from W. M. Tattersall a specimen measuring 25 mm. in length was captured near the middle of June 1906 at 49° 27' N. L., 13° 33' W. L. in the young-fish trawl with 2800 m. of wire out; the depth of sea was 2600 m.

## II. *Erythrops serrata* G. O. Sars.

1863. *Nematopus serratus* G. O. Sars, *Nyt Mag. for Naturv.*, B. XII, p. 235.

! 1870. *Erythrops serrata* G. O. Sars, *Mon. Norges Mysider*, I, p. 27, Tab. II, Fig. 1—12.

1892. — — Norman, *Ann. Mag. Nat. Hist.*, Ser. 6, Vol. X, p. 162, Pl. X, figs. 11.

Occurrence. This species was only taken by the "Thor", which found it at the following places.

South of Iceland: 63° 46' N. L., 22° 56' W. L., 70 fm.; large number of specimens.

— - — 63° 15' — 22° 23' — 114—172 fm.; 8 spec.

— - — 63° 18' — 21° 30' — 94 fm.; 15 spec.

Distribution. The "Thor" has taken it north-east of the Shetlands, 85 fm. and in the North Sea east of Scotland, 47 fm. It is noted from Shetland, 40—60 fm. (Norman), Fair Island, 60—80 fm. (Th. Scott), from several places on the east coast of Scotland (Norman, Th. Scott), from the Irish Sea (Holt & Tattersall) and west coast of Ireland, 80—293 fm. (Norman, Holt & Tattersall). Further, it has twice been taken in the Skagerak at some distance from Jutland in 49 and 70 fm. (Metzger, Meinert). In Norway it is distributed from Christiania Fjord to West Finmark, usually in depths from 80 to 200 fm., but in 30—40 fm. in the inner parts of Christiania Fjord.

## 12. *Erythrops abyssorum* G. O. Sars.

1869. *Erythrops abyssorum* G. O. Sars, *Nyt Mag. for Naturv.*, B. XVI, p. 326.

! 1870. — — G. O. Sars, *Mon. Norges Mysider*, I, p. 36, Tab. V, Fig. 1—12.

Occurrence. The "Ingolf" has not taken this species and it has not been brought home by any Dane from the region in question here, so that it is only included from the literature.

It was taken at West Greenland in Karajok Fjord, ca.  $70^{\circ} 20' N. L.$ , 100 fm. (Vanhöffen). At East Greenland it has been taken at  $72^{\circ} 28' N. L.$ ,  $21^{\circ} 48' W. L.$ , 95 fm. (Ohlin) and somewhat further from the same coast at  $72^{\circ} 25' N. L.$ ,  $17^{\circ} 56' W. L.$ , 158 fm. (Ohlin). Finally, it was taken near Jan Mayen, 195 fm. (G. O. Sars).

**Distribution.** The species is known from Christiania Fjord and from a number of fjords along the northern half of Norway from Lofoten to Varanger Fjord (Sars, Norman, Nordgaard); the depths varied from ca. 106 to 300 fm. Lastly, it was taken in the Kara Sea at depths from 51 to 67 fm. (Hansen).

### 13. *Erythrops erythrophthalma* Goës.

1864. *Mysis erythrophthalma* Goës, Öfv. Kgl. Sv. Vet-Akad. Förh., Årg. 20, p. 178.

! 1870. *Erythrops Goësi* G. O. Sars, Mon. Norges Mysider, I, p. 24, Tab. I.

1870. — — Norman, Ann. Mag. Nat. Hist., Ser. 6, Vol. X, p. 160.

**Occurrence.** The "Ingolf" has not taken this species. It is mentioned from Karajok Fjord, ca.  $70^{\circ} 20' N. L.$  on the west coast of Greenland, 26 fm. (Vanhöffen). At Jan Mayen 2 specimens were taken by the 2<sup>nd</sup> Amdrup Expedition in 50—60 fm.

**Distribution.** It has been taken on the east coast of Scotland in the Firth of Forth (Norman), in the North Sea at least as far south as  $55^{\circ} 8' N. L.$  (Ehrenbaum), in the Skager Rak (Metzger), at a number of places along the whole coast of Norway from Christiania Fjord to Varanger Fjord (Lovén, G. O. Sars, Norman), at Spitzbergen (Goës, Ohlin), the White Sea and Murman Sea (Jarzynsky), Matotschkin Skar and Kara Sea (Stuxberg — it should be added, however, that I am not sure of the correctness of the last two authors' determinations). Lastly, it has also been taken in Cape Cod Bay on the east coast of North America (S. I. Smith). It is found as a rule at depths from 30 to 125 fm. Lo Bianco gives it as having been taken at some places in the Mediterranean in quite 500—600 fm., but I think the specimens have been wrongly determined.

### 14. *Erythrops glacialis* G. O. Sars.

1877. *Erythrops glacialis* G. O. Sars, Arch. Math. og Naturv., B. II, p. 342.

! 1885. — — G. O. Sars, Norske Nordhavs-Exp., Crust. I, p. 45, Pl. V, Fig. 1—4.

**Occurrence.** This species, which I have never seen, is taken from Ohlin, who notes it from East Greenland, off Kaiser Franz Joseph Land, 132 fm.

**Distribution.** The species is further only known from two places west of the middle of Norway in the cold area; the depths were 350 and 498 fm. (G. O. Sars).

### 15. *Meterythrops robusta* S. I. Smith.

1879. *Meterythrops robusta* S. I. Smith, Transact. Conn. Acad., Vol. V., p. 93, Pl. XII, figs. 1—2.

! — *Parerythrops* — G. O. Sars, Mon. Norges Mysider, III, p. 98, Tab. XXXIX.

**Occurrence.** The "Ingolf" has twice taken this species.



Davis Straits: St. 31: 66° 35' N. L., 55° 54' W. L., 88 fm., temp. 1.6°; 1 spec.

— — — 29: 65° 34' — 54° 31' — 68 — — 0.2°; 1 —

Ohlin gives it from East Greenland: 74° 35' N. L., 18° 15' W. L., 79 fm.

Distribution. The species, which was founded on specimens from Massachusetts Bay and Gulf of St. Lawrence in depths of 33 and 50–70 fm., has according to the literature an extensive distribution. It has been taken on the west coast of Norway at ca. 67 $\frac{1}{3}$ ° N. L. and at several places on its north coast (Bodo, Porsanger Fjord, Varanger Fjord) in 60–150 fm. (G. O. Sars). Further, it was met with near the southern end of Spitzbergen in 146 fm., temp.  $\div$  1.1° (G. O. Sars); finally, in the Kara Sea, 64 fm. (Hansen). The bottom-temperature everywhere has been either negative or very low positive. — Holt and Tattersall's determination of it from the west coast of Ireland rests, according to information kindly sent by the authors, on a confusion of names with *Parerythroptrops obesa* G. O. Sars.

#### 16. *Meterythroptrops picta* Holt & Tatt.

1905. *Meterythroptrops picta*, Holt & Tattersall, Rep. Sea and Inland Fisheries of Ireland, 1902–03, Pt. II, App. no. IV, p. 116 & 143, Pl. XIX, figs. 5–7, Pl. XXV, figs. 8–9.

Occurrence. This species was only taken by the "Thor", which found it at the 5 following localities within our area.

West of Iceland: 65° 08' N. L., 28° 10' W. L., 1240 m., Young-fish trawl, 800 m. wire out; 1 spec.

— — — 65° 10' — 27° 12 $\frac{1}{2}$ ' — ? m., — — 740 m. — 1 —

South — — 61° 34' — 19° 05' — 2160 m., — — 1800 m. — 1 —

— — — 61° 30' — 17° 08' — ? m., — — 1800 m. — 4 —

South-West of the Faeroes: 60° 00' N. L., 10° 35' W. L., 1015 m., Young-fish trawl, 1000 m. wire out; 1 spec.

Distribution. The "Thor" has also taken this species twice west of the Hebrides in the young-fish trawl with 1500 meters wire out. It was founded on a single specimen taken west of Ireland in a net sunk to the bottom, 382 fm. — All the 7 localities of the "Thor" show, that the species belongs to the mesoplankton, the young-fish trawl fishing in 180 to 450 fm.

Remarks. This beautiful species is extremely easily recognised. An adult male measures 12.4 mm.

#### 17. *Parerythroptrops obesa* G. O. Sars.

1864. *Nematopus obesus* G. O. Sars, Nyt Mag. for Naturv., B. XV, p. 258.

! 1870. *Parerythroptrops obesa* G. O. Sars, Mon. Norges Mysider, I, p. 41, Tab. III.

Occurrence. The species has only once been taken by the "Thor" at the following locality.

South of Iceland: 63° 5' N. L., 20° 7' W. L., 295 fm.; several specimens.

Distribution. The species occurs along the Norwegian coast from Christiania Fjord to West Finmark, 50–300 fm. (G. O. Sars; Nordgaard). Further, it was taken west and south-west of Ireland (Holt & Tattersall, who discuss its bathymetric occurrence in 1905). Lo Bianco gives it from some places in the Mediterranean in depths of quite 500 to over 600 fm., but this determination until further information is forthcoming must be regarded as uncertain.

**18. *Parerythroptus spectabilis* G. O. Sars.**

1877. *Parerythroptus spectabilis* G. O. Sars, Arch. for Math. og Naturv., B. II, p. 343.

! 1885. — — G. O. Sars, Norske Nordhavs-Exp., Crust. I, p. 47, Pl. V, Fig. 5—12.

Occurrence. The "Ingolf" has once taken this species.

North-West of the Færoes: St. 138: 63° 26' N. L., 7° 56' W. L., 471 fm., temp. ÷ 0.6°; 1 spec.

It is given from West Greenland: Karajok Fjord, ca. 70° 20' N. L. (Vanhöffen). It was taken by the North-Atlantic Expedition south-west of Jan Mayen: 70° 41' N. L., 10° 10' W. L., 263 fm., temp. ÷ 0.3°. Ohlin gives it from East Greenland, north of Kaiser Franz Joseph Fjord, 132 fm.; and from 74° 52' N. L., 17° 16' W. L., 185 fm.

Distribution. The species is otherwise known only from a place in the cold area, namely, off Norway at 63° 10' N. L., 417 fm., temp. ÷ 1.0° (G. O. Sars). It has thus been taken at only 6 localities in all, probably all with negative bottom-temperature.

**19. *Amblyops abbreviata* M. Sars.**

1869. *Pseudomma abbreviatum* M. Sars, Forh. Vid. Selsk. Christiania f. 1868, p. 262 (without description).

1869. *Amblyopsis abbreviata* G. O. Sars, Nyt Mag. for Naturv., B. XVI, p. 328.

! 1872. *Amblyops abbreviata* G. O. Sars, Mon. Norges Mysider, II, p. 5, Tab. VI.

Occurrence. The "Ingolf" has taken this species once.

Davis Straits: St. 35: 65° 16' N. L., 55° 05' W. L., 362 fm., temp. 3.6°; 3 spec.

According to the Malac. Groenl. it was taken by the "Fylla" in the Davis Straits: 65° 35' N. L., 54° 50' W. L., 80 fm. It was found by the "Thor" south of Iceland: 63° 46' N. L., 22° 56' W. L., 79 fm.; 2 spec.

Distribution. Otherwise it is known from Norway, where it has been taken at a number of localities from Christiania Fjord to Vardø in depths from 100 to 300 fm. (G. O. Sars). Besides it has been taken three times west of Ireland, in depths from 337 to 454 fm. (Holt & Tattersall).

**20. *Amblyops* n. sp. = *A. Crozetii* Ohlin not Sars.**

Occurrence. According to Ohlin it was taken between East Greenland and Jan Mayen: 72° 42' N. L., 14° 49' W. L., 1058 fm., 5 specimens.

Remarks. Ohlin (l. c., p. 74) does not describe the 5 specimens mentioned, which he refers to the *A. Crozetii* G. O. S. taken at 46° 16' N. L. in the Southern Ocean; he says he is only able to find "very slight differences in a few respects" between Sars' description and figures of this southern species and his own arctic specimens. As I believe, at any rate until further information is forthcoming, that the form taken off East Greenland must be specifically distinct from *A. Crozetii*, I have preferred to give the arctic form as a new species without however giving it any name.

**21. *Paramblyops rostrata* Holt & Tatt.**

1905. *Paramblyops rostrata* Holt & Tattersall, Rep. Sea and Inland Fisheries of Ireland, 1902—1903, Pt. II, App. no. IV, p. 125 and 144, Pl. XXI.

Occurrence. Hitherto this species has only once been taken by the "Thor".

South-West of the Færoes: 61° 15' N. L., 9° 35' W. L., 450—500 fm.; 4 spec.

Distribution. Hitherto only known from localities west of Ireland where it was taken several times in depths from 180 to 382 fm. (Holt & Tattersall).

## 22. *Pseudomma roseum* G. O. Sars.

Pl. V, fig. 2 a—2 b.

1870. *Pseudomma roseum* G. O. Sars, Forh. Vid. Selsk. Christiania f. Aar 1869, p. 154.

! 1870. — — G. O. Sars, Mon. Norges Mysider, I, p. 54, Tab. IV.

Occurrence. The "Ingolf" has twice taken this species.

Davis Straits: St. 35: 65° 16' N. L., 55° 05' W. L., 362 fm., temp. 3·6°; 1 spec.

— — - 27: 64° 54' — 55° 10' — 393 — — 3·8°; 4 —

It has also been obtained at other localities; at the first named it was taken by Admiral Wandel, at the others by the "Thor".

Davis Straits: 66° 49' N. L., 56° 28' W. L., 235 fm., temp. 4·4°; 1 spec.

South of Iceland: 63° 05' N. L., 20° 07' W. L., 300 fm.; 5 spec.

South-West of the Færoes: 61° 15' N. L., 9° 35' W. L., 450—500 fm.; 9 spec.

— - — 61° 08' — 9° 28' — 434 fm.; 3 spec.

Distribution. As *P. frigidum* n. sp. has to be separated as a distinct species from *P. roseum*, the distribution offers some difficulties, as Sars has mixed the two species and it is not always possible to determine with certainty to which of them the specimens from certain of the localities mentioned in the literature have belonged. It is certainly this species, which Sars has had before him from localities on southern and western Norway up to West Finmark, 100—450 fm. The specimens mentioned by S. I. Smith as taken at New England, at ca. 40° N. L., 500 fm. and in the Gulf of Maine, 105 fm., probably belong to this species likewise, and it is not unlikely that his specimens taken in the Gulf of St. Lawrence in 110 and 210 fm. also belong here. Specimens given from distinctly arctic localities all belong probably to *P. frigidum* and are mentioned under that species. Holt & Tattersall's statement in 1905 of the occurrence of *P. roseum* in localities west of Ireland has arisen from an error which the authors corrected in their subsequent paper published in 1906.

## 23. *Pseudomma frigidum* n. sp.

Pl. V, fig. 3 a—3 b.

Description. Stands extremely near to *P. roseum*, but is much larger, the adult female of the latter species being only ca. 15 mm. long whilst two females of *P. frigidum* (from "Ingolf" St. 138) measure 25·2 mm. from the anterior edge of the eye-plate to the end of the telson; the single male I have is 23 mm. But the species may be even larger, as Ohlin gives 28 mm. for the female, 24 mm. for the male. The eye-plate (fig. 3 a) is almost as in *P. roseum*, but the serrulation is a little less developed. The antennal squama (fig. 3 b) offers a prominent characteristic: the smooth part of the

outer edge to the tip of the marginal spine is but little less than twice as long as the oblique setigerous distal edge measured to the base of the marginal spine, whereas in *P. roscum* the smooth outer edge is only  $\frac{3}{2}$  times longer than the setigerous distal edge. The telson almost as in *P. roscum*.

Occurrence. The "Ingolf" has once taken the species.

North-West of the Færoes: St. 138:  $63^{\circ} 26' N. L.$ ,  $7^{\circ} 56' W. L.$ , 471 fm., temp.  $\div 0.6^{\circ}$ ; 8 specimens. The Ryder expedition has also taken a single specimen, a male, south of Jan Mayen:  $70^{\circ} 32' N. L.$ ,  $8^{\circ} 10' W. L.$ , 470 fm. Ohlin gives *P. roscum* from 3 localities at East Greenland, namely, in Franz Joseph Fjord, off the same fjord, and at  $74^{\circ} 30' N. L.$ ,  $18^{\circ} 40' W. L.$ , depths from 42–53 fm. and down to 132 fm.; as the localities are distinctly arctic and his specimens, as mentioned above, agree with *P. frigidum* in size, it is undoubtedly this species and not *P. roscum* which he has had in his hands.

Distribution. G. O. Sars in the Norwegian North-Atlantic Expedition mentions his having had unusually large specimens of *P. roscum* from two localities in the cold area: the one of these at  $63^{\circ} 10' N. L.$  off Norway, depth 417 fm., temp.  $\div 1.0^{\circ}$ , the other is given as from "the tract of Ocean south-west of Jan Mayen (Stat. 251)" — but some error must have crept in here as Stat. 251 lies off Lofoten (depth 634 fm., temp.  $\div 1.3^{\circ}$ ). The specimens from these two localities have certainly been *P. frigidum*. Further, I am inclined to believe that Stuxberg's determination, Matotschkin Shar, 60–70 fm., should also be relegated to this species.

#### 24. *Pseudomma affine* G. O. Sars.

1870. *Pseudomma affine* G. O. Sars, Forh. Vid. Selsk., Christiania, Aar 1869, p. 156.  
 1872. — — G. O. Sars, Mon. Norges Mysider, II, p. 57, Tab. V, Fig. 13–22.  
 1906. — — Holt & Tattersall, Fisheries, Ireland, Sci. Invest., 1904, V, p. 27, Pl. III, figs. 1–6.

Occurrence. The species has only been taken by the "Thor", at the following locality.

South-West of the Færoes:  $61^{\circ} 08' N. L.$ ,  $9^{\circ} 28' W. L.$ , 434 fm.; many specimens.

Distribution. It has been taken in the north of western Norway up to Lofoten, 100–200 fm. (G. O. Sars). Has further been trawled by the "Thor" in the North Sea at  $58^{\circ} 32' N. L.$ ,  $4^{\circ} 18' E. L.$ , 148 fm., and several times west of Ireland in depths from 120 to 500 fm. (Holt & Tattersall). Lo Bianco states that he has seen specimens taken at 3 places in depths of over 500 and 600 fm. in the Mediterranean, but I greatly doubt the correctness of his determination.

Remarks. As shown by Sars, the eye-plate in the females is produced forwards in a cleft process, by means of which they are easily known from *P. roscum*, but on the other hand the extent of the marginal serrulation does not agree with Sars' description, as in my specimens the posterior part of the lateral margin is smooth, so that the serrulated part is not much longer than in *P. roscum*, whereas according to Sars the serrulation in *P. affine* reaches to behind the lateral corner. The telson in my specimens shows an intermediate stage between Sars' figures of *P. roscum* and *P. affine*, its posterior margin being less broad than in the latter and with 3, at most 4, pairs of spines. Nevertheless I consider that my specimens, especially on account of the form of the eye-plate at the centre of its anterior margin, must be referred to *P. affine* G. O. S.

**25. *Pseudomma truncatum* S. I. Smith.**

1879. *Pseudomma truncatum* S. I. Smith, Trans. Conn. Acad. Vol. V, p. 99, Pl. XII, figs. 3, 4.

! 1879. — — G. O. Sars, Mon. Norges Mysider, III, p. 102, Pl. XL.

Occurrence. Was once taken by the "Ingolf".

North of Iceland: St. 128: 66° 50' N. L., 20° 02' W. L., 194 fm., temp. 0.6°; 1 spec.

It is also noted from Karajok Fjord, West Greenland, at 70° 20' N. L., 102 fm. (Vanhöffen).

Distribution. The species was founded on specimens taken in the Gulf of St. Lawrence in depths from 45 to 70 fm.; Sars gives it from Varanger Fjord, 150 fm., from a point south of Spitzbergen, 267 fm., temp.  $\div$  1.1° and from another west of Spitzbergen, 125 fm., temp. 1.9°. It is further known from the Kara Sea, 51 fm. (Hansen), and is noted from Behring Sea (Richters), but though the last-named locality is not improbable, the correctness ought to be confirmed.

**26. *Pseudomma Thééli* Ohlin.**

1901. *Pseudomma Thééli* A. Ohlin, Bih. Kgl. Sv. Vet-Akad. Handl., B. 27, Afd. IV, no. 8, p. 78, Fig. 5.

Occurrence. This species is as yet only known from the two type-specimens taken at "East Greenland, Franz Joseph Fjord, entrance of Musk-ox Fjord, depth 220 m." (116 fm.).

**27. *Pseudomma parvum* Vanhöffen.**

Pl. V, fig. 4 a—4 h.

1897. *Pseudomma parvum* E. Vanhöffen, Drygalski's Grönland-Expedition, p. 199.

! 1907. — — Zool. Jahrb., Abth. für Systematik, B. XXV, p. 508, Taf. 20, Fig. 1—3.

Description. This description<sup>1</sup> is founded on 2 specimens, a fine, egg-carrying female and a somewhat mutilated male, both most kindly placed at my disposal by the founder of the species.

Anterior margin of eye-plate taken as a whole (fig. 4 a) is somewhat strongly convex, but in the centre there is a fairly slight inbending, angular at its base though a median narrow cleft is absent; further, the margin is somewhat concave for a considerable distance about half way between the median line and the lateral corner, whilst its lateral portion is very convex. The upper surface and anterior margin of the eye-plate under a magnification of quite 100 times show a number of small, conical protuberances and a quantity of fine hairs of the same length, further a somewhat larger tubercle directed forwards and upwards near the anterior margin a little distance from the median line. The front margin of the carapace under the lateral corner of the eye-plate is regularly and moderately strongly serrulated for a part of its length. — The antennal squama (fig. 4 b) is almost as in *P. Thééli*, a little over five times as long as broad; almost two-thirds of the terminal margin is somewhat convex whilst the remaining third is the base for the process at the outer margin, which is specially large, both broad and thick at the root and extending far out over the distal edge; the setæ along the inner margin are extremely long, the longest indeed being but little shorter than the

<sup>1</sup> My description and drawings had been made a long time before Dr. Vanhöffen published his more detailed account of this species.

squama. The last joint of the mandibular palp (fig. 4 c) is comparatively much broader and somewhat shorter than in *P. roscum*, and distinctly triangular. In the maxillipeds (fig. 4 d) the 5<sup>th</sup> to 7<sup>th</sup> joints especially are somewhat broader than in *P. roscum*, the 5<sup>th</sup> besides obviously shorter than in this species. The 2<sup>nd</sup> joint of the first pair of legs has on its underside distally a distinct, thick, rounded protuberance and proximally a smaller one; the whole leg (fig. 4 e) is somewhat thicker and shorter than in *P. roscum*, the 5<sup>th</sup> and 6<sup>th</sup> joints especially being shorter; the proximal part of the exopod is very broad. In the female the 4<sup>th</sup> and 5<sup>th</sup> pair of abdominal appendages (fig. 4 f) especially are obviously longer than in *P. roscum*, the 4<sup>th</sup> pair being a little longer than the 5<sup>th</sup> segment, the 5<sup>th</sup> pair even a little longer than the long 6<sup>th</sup> segment. The inner branch of the uropods (fig. 4 g) reaches quite as far backwards as the outer branch, whereas in *P. roscum* it is considerably shorter than the latter. The telson (fig. 4 h) is somewhat longer and narrower than in *P. roscum*; its end in my single specimen with the tail-fan well preserved is broad and somewhat flatly rounded with 3 pairs of long spines of equal length, whilst ciliated setæ could not be detected; on each lateral margin are 5 to 6 spines. — Length of an ovigerous female 13 mm.

Remarks. This species is widely separated by the structural characters mentioned from all the foregoing except *P. Théli* to which it stands near especially in the form of the squama, the last joint of the mandibular palps and the comparatively plump maxillipeds and first pair of legs. But *P. Théli* according to Ohlin is 20 mm. long, thus much larger, its eye-plate shows quite a different form and its telson is somewhat longer in relation to its breadth.

Occurrence. West Greenland: Karajok Fjord, ca. 70° 20' N. L., 100 fm., Vanhöffen.

## 28. *Mysidopsis didelphys* Norm.

1863. *Mysidopsis didelphys* Norman, Trans. Tyneside Natur. Field Club, Vol. V, p. 270, Pl. XII, figs. 9—11 (teste Norman).

1872. *Mysidopsis didelphys* G. O. Sars, Mon. Norges Mysider, II, p. 20, Tab. VII.

Occurrence. Only twice taken by the "Thor".

South of Iceland: 63° 46' N. L., 22° 56' W. L., 80 fm.; ca. 15 spec.

— — — 63° 18' — 21° 30' — 94 —; 2 spec.

Distribution. It is known from the Shetlands, both coasts of Scotland and north-east England, 40—70 fm. (Norman, Th. Scott), west of Ireland in depths from a little over 50 to 199 fm. (Holt & Tattersall), also Skager Rak N. E. from the north point of Jutland, 110 fm. (Meinert) and Norway from Christiania Fjord to Lofoten, 30—150 fm. (G. O. Sars).

## 29. *Pseudomysis abyss* G. O. Sars.

Pl. V, fig. 5 a—5 d.

1879. *Pseudomysis abyss* G. O. Sars, Arch. Math. og Naturv., IV, p. 430.

1885. — — G. O. Sars, Norske Nordhavs-Exp., Crust. I, p. 50, Pl. V, Fig. 13—21, Pl. XX, Fig. 18—20.

Occurrence. Taken three times by the "Ingolf".

South of Jan Mayen: St. 113: 69° 31' N. L., 7° 06' W. L., 1309 fm., temp.  $\div$  10°; 3 spec.

— — — — 117: 69° 13' — 8° 23' — 1003 — —  $\div$  10°; 1 —

North-East of Iceland: — 110: 66° 44' — 11° 33' — 781 — —  $\div$  0.8°; 1 —

Distribution. Sars had 2 specimens, both taken between North Cape and Jan Mayen, the one at 72° N. L., in 1110 fm., temp.  $\div$  13°, the other in the stomach of *Rhodichthys regina* from 72° 36' N. L., 1280 fm., temp.  $\div$  14°. Ohlin had a fragment from 78° 19' N. L., 8° 41' E. L., 1428 fm., temp.  $\div$  14°. The species thus dwells in considerable depths with low to very low temperatures, always negative, in the Northern Ocean between Iceland, East Greenland, Spitzbergen and Norway.

Remarks. A small addition to Sars' (and Ohlin's supplementary) description may be given here. My best specimens are from St. 117; the one of these is a female with marsupium measuring ca. 45 mm. from the tip of the rostrum to the end of the telson, whilst a male is 42 mm. long. The eye-stalks differ a little in form; the most distal part is sometimes more developed than Sars gives it, in form like a conical process pointing forwards (fig. 5 a). — The female has 3 pairs of marsupial lamellæ, the first pair small. — The pleopods of the male resemble in most features those in *Mysideis insignis* G. O. S.; on the first pair (fig. 5 b) the outer branch is but little longer than that of the fourth pair, whilst the inner branch (fig. 5 c) is very short (yet by comparison considerably larger than in *M. insignis*), oblong-eggshaped, distally broadly rounded, with the usual basal side-process on the outer margin. The II<sup>nd</sup>—IV<sup>th</sup> pairs are almost the same both in form and length of rami; in the IV<sup>th</sup> (fig. 5 d) the exopod is but little longer than the endopod, but the penultimate joint half as long again as the antepenultimate, and there are no thick terminal setæ with hairs covering the one side as in *M. insignis*.

### 30. *Mysideis insignis* G. O. Sars.

1864. *Mysis insignis* G. O. Sars, *Nyt Mag. for Naturv.*, B. XIII, p. 245.

! 1879. *Mysideis insignis* G. O. Sars, *Mon. Norges Mysider*, III, p. 2, Tab. IX—X.

Occurrence. Only once taken by the "Thor".

South of Iceland: 63° 15' N. L., 22° 23' W. L., 114—172 fm.; ca. 10 spec.

Distribution. The species has been taken in Christiania Fjord and along the west coast of Norway at least to Malangen, ca. 69 $\frac{2}{3}$ ° N. L., in 50 to 300 fm. (G. O. Sars, Nordgaard). It was next taken west and south-west of Ireland in depths from a little over 50 to 372 fm. (Norman, Holt & Tattersall).

### 31. *Stilomysis grandis* G. O. Sars.

1864. *Mysis grandis* A. Goës, *Öfv. Kgl. Sv. Vet. Akad. Förh.*, Årg. 20, 1863, p. 176.

! 1879. *Mysideis grandis* G. O. Sars, *Mon. Norges Mysider*, III, p. 106, Tab. XLI—XLII.

Occurrence. Once taken by the "Ingolf".

Baffin Bay: St. 33: 67° 57' N. L., 55° 30' W. L., 35 fm., temp. 0.8°; 4 spec.

In Malac. Groenl. it is noted from an adjacent place in Baffin Bay: 67° 4' N. L., 54° 28' W. L., 32 fm., 2 specimens; later, some specimens were taken at Jakobshavn, 69° 13' N. L., by Traustedt.

According to Ohlin it has twice been taken at East Greenland, namely, in Franz Joseph Fjord in 55 fm. and at  $74^{\circ} 35' \text{ N. L.}$ ,  $18^{\circ} 15' \text{ W. L.}$ , 79 fm.

**Distribution.** It is known from West and East Finmark, 30—100 fm. (G. O. Sars). At Spitzbergen it has been taken not a few times (Goës, Ohlin, Zimmer) up to  $80^{\circ} \text{ N. L.}$ ; in a single case the depth was only 5—16 fm. Lastly it was found at  $70^{\circ} 51' \text{ N. L.}$ ,  $53^{\circ} \text{ E. L.}$ , 29 fm. (Stebbing). Richters gives it from the Bering Sea, 70 fm., but this determination, in itself not improbable, needs confirmation.

### 32. *Mysis (Praunus) inermis* Rathke.

1843. *Mysis inermis* Rathke, Nova Acta Acad. Cæs. Leop.-Car., Tab. XX, p. 20.

1861. — *cornuta* Kroyer, Nat. Tidsskr., 3. Række, B. I, p. 26, Tab. I, Fig. 3 a—g.

! 1879. — *inermis* G. O. Sars, Mon. Norges Mysider, III, p. 54, Tab. XXVII.

**Occurrence.** The "Ingolf" has not taken this species. But to judge from the material in the Copenhagen Museum it must be common at the Færoes, as it has been taken a number of times at various localities: Thorshavn, Kvalbo, Kolle Fjord, Tveraa, Sandvaag, Trangisvaag. The depths were quite small, greatest  $9\frac{1}{2}$  fm.

**Distribution.** The species occurs at Shetland, on both coasts of Scotland, north-east England, Plymouth and Guernsey (Norman); further, in the Zuidersee (Metzger), south-east of Yarmouth (Metzger) and at Heligoland (several observers). It is found at Denmark (Meinert), west coast of Sweden (Goës) and deep in the Baltic (Lindstrom), further it has been taken at Bohuslän (Goës) and is common along the whole coast of Norway (G. O. Sars). Lastly, it has been taken in the White Sea and in the Murman Sea (Czerniavsky and Jarzynsky), a single specimen is noted from Spitzbergen (Kroyer). It is distinctly a shallow water species, usually in depths from 2 out to 10 fathoms.

### 33. *Mysis (Schistomysis) ornata* G. O. Sars.

1864. *Mysis ornata* G. O. Sars, Nyt Mag. for Naturv., B. XIII, p. 264.

! 1879. — — G. O. Sars, Mon. Norges Mysider, III, p. 62, Tab. XXIX.

**Occurrence.** The species was taken 6 times by the "Thor" off the south coast of Iceland between  $22^{\circ} 56'$  and  $16^{\circ} 32' \text{ W. L.}$  in depths from ca. 25 to 80 fathoms.

**Distribution.** The species is known at Shetland and from several places along the east coast of Great Britain (Norman, Metzger), at Liverpool (Walker), south-west coast of Ireland (Norman), Channel (Internat. Explor.), Holland (Hoek), mouth of the Seine (de Kerville, teste Norman) and Concarneau on the south-west coast of Brittany (Bonnier). It has been taken at two places in the Baltic about the Danish Islands as also round the Kattegat in depths from 4 to  $17\frac{1}{2}$  fm. (Meinert), further repeatedly in the Skagerak and various parts of the North Sea (several observers). At Norway it goes from Christiania Fjord to Lofoten in depths from 15—20 fm. down to at least 50 fm. (G. O. Sars).

### 34. *Mysis oculata* O. Fabr.

1780 (?). *Cancer oculatus* O. Fabricius, Fauna Groenl., p. 245.

1781 (?). — — O. Fabricius, Kgl. D. Vid. Selsk. Skrifter, Ny Samling, I, p. 565, Fig. 2, A and B.



1846. *Mysis oculata* H. Krøyer, Voy. en Scand., Crust. Pl. VIII, figs. 2, a—r and figs. 3, a—f.  
 1861. — — H. Krøyer, Nat. Tidsskr., 3. Række, B. I, p. 13.  
 1879. — — G. O. Sars, Mon. Norges Mysider, III, p. 69, Tab. XXXI.

Occurrence. The "Ingolf" has not taken this species.

It is given from 79° 38' N. L. at Grinnell Land (Miers). According to Ortmann (1901), Ohlin (1895) and myself in Malac. Groenl. the species is common through Smith Sound, on both sides of Baffin Bay and along the east coast of Davis Straits; the numerous depths noted all lie between 2—3 fm. to 30—40 fm., but it is doubtful as yet whether depths a little greater are correct, as the specimens, which certainly at times live pelagically, might be taken in the apparatus on hauling in. At East Greenland it is likewise common; it was repeatedly taken at Tasiussak and a little north of this to 66° 15' N. L. (1<sup>st</sup> Amdrup Exped.), further in enormous numbers in the eel-seine in 7—0 fm. at 70° 50' N. L., 22° 31' W. L., and two specimens at Sabine Islands: 74° 1/2° N. L., 18° 2/3° W. L. (2<sup>nd</sup> Amdrup Exped.); Buchholz had already noted it from the last-named locality and from Cape Philip Brooke (74° 56' N. L., 17° 36' W. L.); Ohlin gives it from 4 East Greenland localities, lying respectively in Scoresby Sound and north of Kaiser Franz Joseph Fjord. It was also taken by the 2<sup>nd</sup> Amdrup Expedition at Jan Mayen, where it had been observed previously in quite enormous quantities (G. O. Sars). Further, according to material in the Copenhagen Museum, it has often been taken at Iceland, both on its west coast (Reykjavik and Faxa Fjord), north coast (Önundar Fjord, Öfjord) and east coast (Seydis Fjord and Rode Fjord), but has not been met with on its south coast and seems to be absent at the Færoes.

Distribution. The species is arctic. It is known from West Finmark (Sp. Schneider), East Finmark (G. O. Sars), Murman Sea, Sea of Kara and Siberian Arctic Ocean to the east as far as 85° E. L. (Stuxberg); further, it is common round Spitzbergen (several observers). According to Packard it is "abundant along the whole coast" of Labrador, but Stimpson's statement of its occurrence on the north-east coast of the States is extremely doubtful according to Smith. Lastly, it is given from the Bering Sea (Richters). It is usually found in 2 to 20 fm. and there are several notes of its occurrence in 30—70 fm., but these last I think are not so reliable, as I believe it possible as already mentioned that the specimens on the occasions were taken in the apparatus on hauling in. — The variety *M. relicta* found in brackish and fresh water is omitted here.

Remarks. The largest female (from East Greenland at 70° 50' N. L.) is 297 mm. long from front end of rostrum to tip of telson; a large male is 264 mm. long. Ohlin reports that his largest specimen from Smith Sound was 33 mm. long.

### 35. *Mysis mixta* Lilljeb.

1853. *Mysis mixta* W. Lilljeborg, Öfv. Kgl. Sv. Vet. Akad. Förhandl. 9. Ärg. 1852, p. 6.  
 1861. — latitans Krøyer, Nat. Tidsskr., 3. Række, B. I, p. 30, Tab. I, Fig. 4 a—b.  
 1879. — mixta G. O. Sars, Mon. Norges Mysider, III, p. 76, Tab. XXXIII.

Occurrence. The "Ingolf" has not taken this species.

At West Greenland it has sometimes been taken, thus in Disco Bay, at Godhavn, Jakobshavn,

Christianshaab and Holsteensborg, that is from ca.  $69\frac{1}{3}^{\circ}$  N. L. to  $66^{\circ} 56'$  N. L., and the depths varied from 5 to 15 fm. At East Greenland it was twice taken by the 2<sup>nd</sup> Amdrup Expedition, namely, along with the previous species in the eel-seine in 7—0 fm. at  $70^{\circ} 30'$  N. L.,  $22^{\circ} 31'$  W. L., and at  $72^{\circ} 28'$  N. L.,  $25^{\circ} 23'$  W. L., 3—14 fm.; Ohlin mentions some specimens from the same coast north of Kaiser Franz Joseph Fjord at similar depths. According to material in our Museum it has been taken very frequently at Iceland, namely, on the west coast (Skagi, Reykjavik at the latter locality according to G. O. Sars), north-west coast (Patrik Fjord and Önundar Fjord), north coast (Skálfandi) and east coast (Seydis Fjord, Rode Fjord and Beru Fjord); the depths were usually from 10 to 35 fm., sometimes possibly less, whilst 74 fm. is once noted. On the other hand, it is not known from the south coast of Iceland nor from the Færoes.

**Distribution.** The species has often been taken on the east coast of North America from Fundy Bay to Massachusetts Bay, 20 to 90 fm. (Smith). In Europe its distribution is characteristic: it is given from the Baltic, penetrating right up into the Gulfs of Bothnia and Finland (Internat. Explor.), has been several times taken near the Danish Islands (Meinert), has been found at Kullen on the west coast of Sweden (Lilljeborg), in the inner parts of Christiania Fjord and in Trondhjem Fjord, is also common from Lofoten northwards along the coast and at East Finmark (G. O. Sars). Lastly, it is given from the White Sea and Murman Sea (Czerniavsky and Jarzynsky). At Denmark it has been taken in 6 fm., whilst Sars gives 20—100 fm. for its occurrence at Norway.

**Remarks.** The largest specimens are, as was to be expected, from East Greenland. The largest specimen, a female with half-developed marsupium, measures 31.2 mm. from tip of rostrum to end of telson; the males are not nearly so large and one of the largest from the same locality ( $70^{\circ} 50'$  N. L.) is only 22.6 mm. long.

#### ADDITIONS AND CORRECTIONS.

*Inachus leptochirus* Leach is to be added to the list of Decapoda from the region defined for investigation, as A. Appellöf states (Die Dekapoden Crustaceen, 1906, p. 187) that the "Michael Sars" took this species "auf dem Færø-Plateau (Tiefe 125 Met.);" he adds that he is unable to decide whether some very small specimens of the genus *Inachus* from the same locality belong to *I. dorychnus* Leach.

In the lists of synonymy the following dates of publication are to be corrected. In the lists on p. 16, p. 17 and p. 25 Bell, Brit. Crust. is given as published in 1844 instead of 1853. In the lists belonging to *Galacantha rostrata* (p. 35) and *Munidopsis curvirostra* (p. 36) Smith's paper is stated as published in 1884 instead of 1882; in the list belonging to *Munidopsis similis* (p. 38) 1887 is given instead of 1886.

## EXPLANATION OF THE PLATES.

## Plate I.

Fig. 1. *Geryon affinis* A. Milne-Edwards & Bouvier.

Fig. 1 a. Carapace of the male; natural size.

— 1 b. Carapace of the ovigerous female; natural size.

Fig. 2. *Cymonomus Normani* Lankester.Fig. 2 3. Body of the female from the "Ingolf";  $\times$  scarcely 5.— 2 b. Outline of the front part of the carapace with the eye-stalks of the "Ingolf" specimen;  $\times 25/2$ .— 2 c. Outline of the front part of the carapace with the eye-stalks of a female from the "Thor";  $\times 25/2$ .— 2 d. Outline of the front part of the carapace with the eye-stalks of a male from the "Thor";  $\times 25/2$ .— 2 e. Left maxilliped of the "Ingolf" specimen, from below;  $\times 22/3$ .— 2 f. Right first leg of the same specimen;  $\times 22/3$ .— 2 g. Right fourth leg of the same specimen;  $\times 22/3$ .— 2 h. Right fifth leg of the same specimen;  $\times 22/3$ .— 2 i. Distal part of right fifth leg;  $\times 25$ .Fig. 3. *Paralomis spectabilis* n. sp.

Fig. 3 a. Large male, from Stat. 96; natural size.

— 3 b. Front right part with the peduncle of the antenna of the large male shown in fig. 3 a, from above;  $\times$  scarcely 3.— 3 c. Left and right antennal squamæ of the small male (from stat. 92), both from above and a little obliquely from the outer side;  $\times 11/2$ .— 3 d. Left and right antennal squamæ of a large female (from stat. 96), both vertically from above;  $\times$  a little more than  $5/2$ .

## Plate II.

Fig. 1. *Paralomis spectabilis* n. sp. (continued).Fig. 1 a. Abdomen of the male from Stat. 96;  $\times 10/9$ .

— 1 b. Abdomen of the female from Stat. 96; natural size.

Fig. 2. *Paralomis Bouvieri* n. sp.

Fig. 2 a. The female; natural size.

— 2 b. Front end of cephalothorax and eyes of the male;  $\times 5$ .— 2 c. Front right angle of cephalothorax with the proximal part of the antenna of the female, from above;  $\times 5$ .— 2 d. Front right angle of cephalothorax with the proximal part of the antenna of the male, from above;  $\times 5$ .— 2 e. Front left angle of cephalothorax with the proximal part of the antenna of the male, from above;  $\times 5$ .— 2 f. Abdomen of the male;  $\times 5/2$ .— 2 g. Abdomen of the female;  $\times 3/2$ .

Fig. 3. *Munida bamffica* Pennant.

Fig. 3 a. Thoracic sternum with the basal joint of the appendages of the right side of a male from 61° 9' N. L., 7° 34' W. L., 180 fm.;  $\times 3$ .

Fig. 4. *Munida tenuimana* G. O. Sars.

Fig. 4 a. Thoracic sternum with the basal joint of the appendages of the right side of a large male from the "Ingolf" Stat. 9;  $\times 3$ .

### Plate III.

Fig. 1. *Munida tenuimana* G. O. Sars (continued).

Fig. 1 a. Body of a large male from the "Ingolf" Stat. 9;  $\times 2$ .

Fig. 2. *Munidopsis curvirostra* Whiteaves (on the plate *curvirostris*).

Fig. 2 a. Largest male from the "Ingolf" Stat. 9;  $\times 2$ .

— 2 b. Cephalothorax of the same male, from the right side;  $\times$  nearly 2.

— 2 c. Cephalothorax of a female from the "Ingolf" Stat. 35;  $\times 9/5$ .

— 2 d. Cephalothorax of another female from the same Station;  $\times 9/5$ .

— 2 e. Cephalothorax of a male from the "Ingolf" Stat. 28;  $\times 9/5$ .

Fig. 3. *Munidopsis Antonii* A. Milne-Edw. & Bouv.

Fig. 3 a. Male;  $\times 3/2$ .

— 3 b. Cephalothorax of the same specimen from the side;  $\times 3/2$ .

Fig. 4. *Munidopsis similis* S. I. Smith.

Fig. 4 a. Ovigerous female; natural size.

— 4 b. Cephalothorax of the same female, from the right side; natural size.

Fig. 5. *Spongicoloides profundus* n. gen., n. sp.

Fig. 5 a. Front part of an ovigerous female, from the left side;  $\times 11/2$ .

— 5 b. Rostrum of the same specimen;  $\times 11$ .

— 5 c. Rostrum of another ovigerous female;  $\times 11$ .

— 5 d. Rostrum of a scarcely full-grown specimen;  $\times 11$ .

— 5 e. Left antennula (the flagella mutilated), from below;  $\times 19/2$ .

— 5 f. Left antenna (most of the flagellum omitted), from below;  $\times 19/2$ .

— 5 g. Left mandible, from below;  $\times 15$ .

— 5 h. Distal half of the same mandible, from above;  $\times 22$ .

5 i. Left maxillula, from below;  $\times 15$ .

— 5 k. Left maxilla, from below;  $\times 15$ . 1. basal joint; 2. second very short joint produced laterally into the very long, distally cleft lobe,  $l^2$ ; 3. third joint bearing the exopod and produced laterally into the very long distally cleft lobe,  $l^3$ .

### Plate IV.

Fig. 1. *Spongicoloides profundus* n. gen., n. sp. (continued).

Fig. 1 a. Left first maxilliped, from below;  $\times 19/2$ .  $l^2$ . lobe from second joint;  $l^3$ . lobe from the third joint; *cx.* exopod; *cp.* epipod; *br.* rudimentary branchia (arthrobranchia).

— 1 b. Left second maxilliped, from below;  $\times 19/2$ . *cp.* epipod; *arbr.* arthrobranchia; *pobr.* podobranchia.

— 1 c. Left third maxilliped, from below;  $\times 19/2$ . *cp.* epipod; *arbr.* arthrobranchia; *plbr.* pleurobranchia.

— 1 d. Right first trunk-leg, from in front;  $\times 14/3$ .

Fig. 1 e. Same leg;  $\times 10$ .

— 1 f. Right third trunk-leg, from in front;  $\times 14/3$ .

— 1 g. Fifth left trunk-leg, from in front;  $\times 14/3$ .

— 1 h. Distal part of fifth leg;  $\times 20$ .

— 1 i. Pleurobranchia of third trunk-leg;  $\times 21$ .

— 1 k. Second left pleopod, from in front;  $\times 5$ .

— 1 l. Telson and left uropod, from above;  $\times 5$ . (All marginal setae are plumose, but it could not be shown in the figure).

Fig. 2. *Acantheephyra Batei* Faxon (on the plate the synonym *A. brevirostris* Bate).

Fig. 2 a. Front half of the animal;  $\times 3/2$ .

Fig. 3. *Gnathophausia Zoëa* Will.-Suhm.

Fig. 3 a. Terminal part of the left mandible, from below,  $\times 18$ . *c.* cutting edge; *lm.* lacinia mobilis; *m.* pars molaris.

— 3 b. Same part. from above;  $\times 18$ . *l.* lacinia mobilis.

— 3 c. Terminal part of the right mandible; from above;  $\times 18$ .

— 3 d. Left maxillula, from below;  $\times 15/2$ . 1. first joint, from which the long lobe, *l*<sup>1</sup>, proceeds; 2. second joint; 3. third joint produced into a long lobe; 4. fourth joint; 5. fifth joint. The uniformly greyish portions are membranous.

— 3 e. Left maxilla, from below;  $\times 15/2$ . 1. first joint, without any lobe; 2. second joint, from which the very long lobe, *l*<sup>2</sup>, proceeds; 3. third joint, produced into the long, distally cleft lobe, *l*<sup>3</sup>, and bearing the exopod, *ex.*; 4. fourth, and 5. fifth joint, both without any lobe. The uniformly greyish areas are membranous skin.

Fig. 4. *Hansenomysis Fyllæ* H. J. H.

Fig. 4 a. Cephalothorax with the basal parts of the antennula and the antenna of an adult female, from the left side;  $\times 26/3$ . *VI.* and *VII.* sixth and seventh entirely free thoracic segments. *o.* ocular plate.

— 4 b. Front part of cephalothorax with antennulae and antennae of an adult male, from above;  $\times 8$ .

— 4 c. Front part of the carapace with the basal parts of the right antennula and antenna of the female shown in fig. 4 a;  $\times 8$ . *o.* ocular plate.

— 4 d. First right pleopod in the male, from behind;  $\times 19$ .

— 4 e. Second right pleopod in the male, from behind;  $\times 19$ .

— 4 f. Third right pleopod in the male, from behind;  $\times 19$ .

— 4 g. Fourth right pleopod in the male, from behind;  $\times 19$ .

— 4 h. Fifth right pleopod in the male, from behind;  $\times 19$ .

— 4 i. Posterior part of abdomen in the male, from above;  $\times 11$ .

— 4 k. Terminal part of the telson shown in fig. 4 i, from above;  $\times 29$ .

### Plate V.

Fig. 1. *Longithorax fuscus* n. sp.

Fig. 1 a. Female with the marsupium half developed;  $\times$  scarcely 5. Most of the legs broken off.

— 1 b. Head of the same specimen, from the left side;  $\times 8$ . Of the antennula only the two proximal peduncular joints present.

— 1 c. Same head, from above;  $\times 8$ .

— 1 d. Right antennal squama, from above;  $\times 23$ .

Fig. 1 e. Left mandible, from below;  $\times 23$ .

— 1 f. Distal part of left mandible, from below;  $\times 75$ .

— 1 g. Left maxillula, from below;  $\times 44$ .

— 1 h. Left maxilla, from below;  $\times 44$ .

— 1 i. Left maxilliped, from below;  $\times 23$ .

— 1 k. Left first thoracic leg, from below;  $\times 23$ . The exopod broken off.

— 1 l. Exopod of fourth thoracic leg;  $\times 12$ .

— 1 m. Right sixth thoracic leg, from below;  $\times 23$ . The exopod broken off.

— 1 n. Telson and uropods, from above;  $\times 11$ . Distal part of both exopods broken off.

— 1 o. Distal part of the telson, from above;  $\times 22$ . Some of the terminal and marginal spines broken or broken off.

Fig. 2. *Pseudomma roseum* G. O. Sars.

Fig. 2 a. Right antennal squama of an adult female from the "Ingolf" Stat. 27, from above;  $\times$  scarcely 11.

— 2 b. Right antennal squama of an adult male taken by the "Thor", from above;  $\times$  scarcely 11.

Fig. 3. *Pseudomma frigidum* n. sp.

Fig. 3 a. Ocular plate of a female with marsupium;  $\times 11$ .

— 3 b. Right antennal squama of an adult female from the "Ingolf" Stat. 138, from above;  $\times$  scarcely 11.

Fig. 4. *Pseudomma parvum* Vanhöffen.

Fig. 4 a. Ocular plate of an ovigerous female, from above;  $\times 35$ .

— 4 b. Antennal squama of a male;  $\times 26$ .

— 4 c. Left mandible of the adult female, from below;  $\times 28$ .

— 4 d. Left maxilliped of the same female, from below;  $\times 28$ .

— 4 e. Left first thoracic leg of the same female, from below;  $\times 28$ .

— 4 f. Major part of the abdomen of the ovigerous female, seen from the left side especially in order to show the length of the pleopoda;  $\times 12$ .

— 4 g. Telson and right uropod of the adult female, from above;  $\times 21$ .

— 4 h. Telson of the same female;  $\times 35$ .

Fig. 5. *Pseudomysis abyssi* G. O. Sars.

Fig. 5 a. Left eye-stalk of a male, from above;  $\times 10$ .

— 5 b. Right first pleopod of a male, from behind;  $\times 11/2$ .

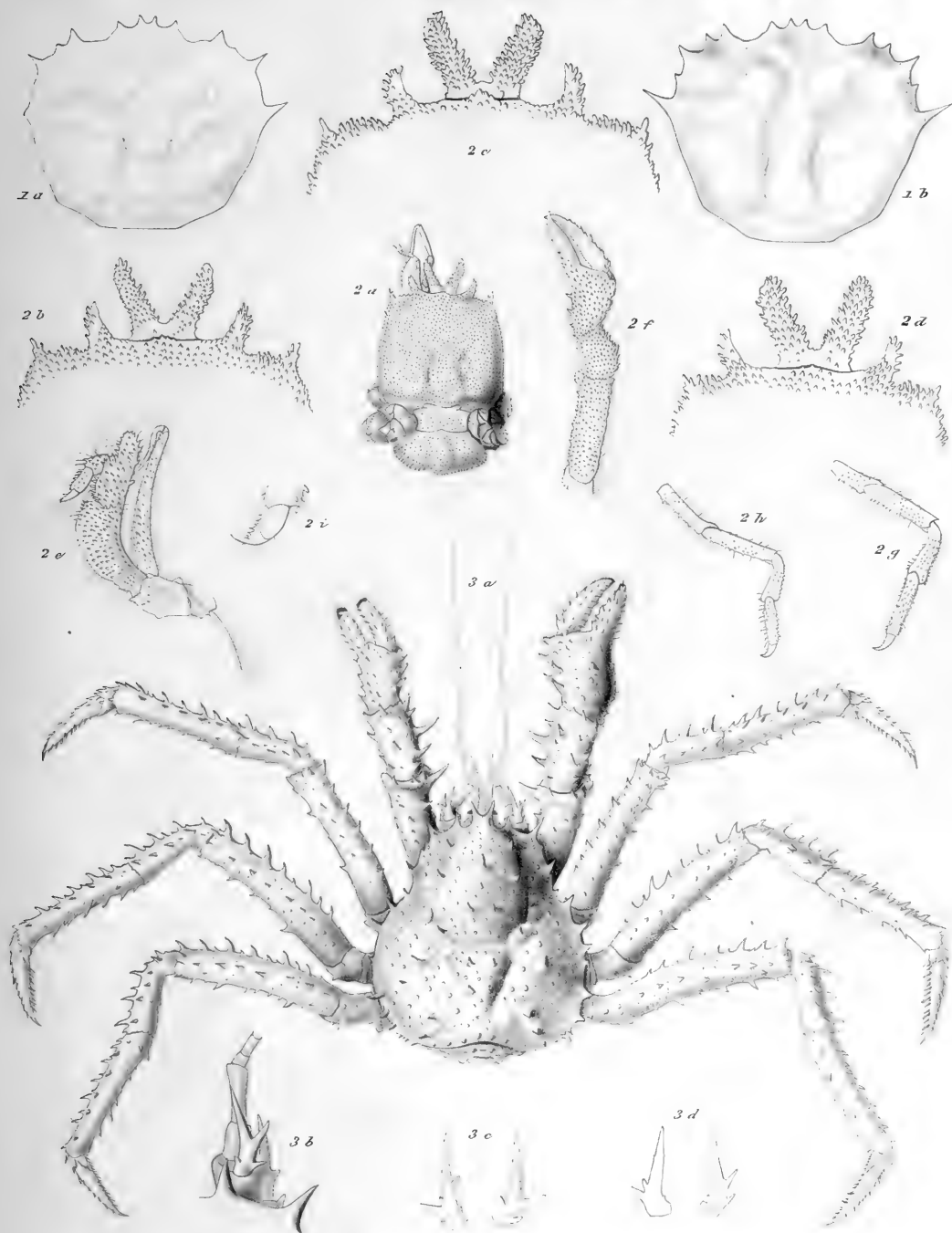
— 5 c. Inner ramus and basal part of the pleopod shown in fig. 5 b;  $\times 12$ .

— 5 d. Right fourth pleopod of the same male, from behind;  $\times 11/2$ .

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Among the figures, figs. 1 a and 1 b on Pl. I, and fig. 2 a on Pl. IV have been drawn by Mr. E. Bang; fig. 3 a on Pl. I, figs. 1 a, 1 b, 2 a, 2 f, 2 g, 3 a and 4 a on Pl. II, figs. 1 a, 3 a, 3 b, 4 a and 4 b on Pl. III have been drawn by Mr. Th. Bloch, but all have been corrected and frequently considerably altered by the author. All the remaining figures on the Plates have been drawn by the author.

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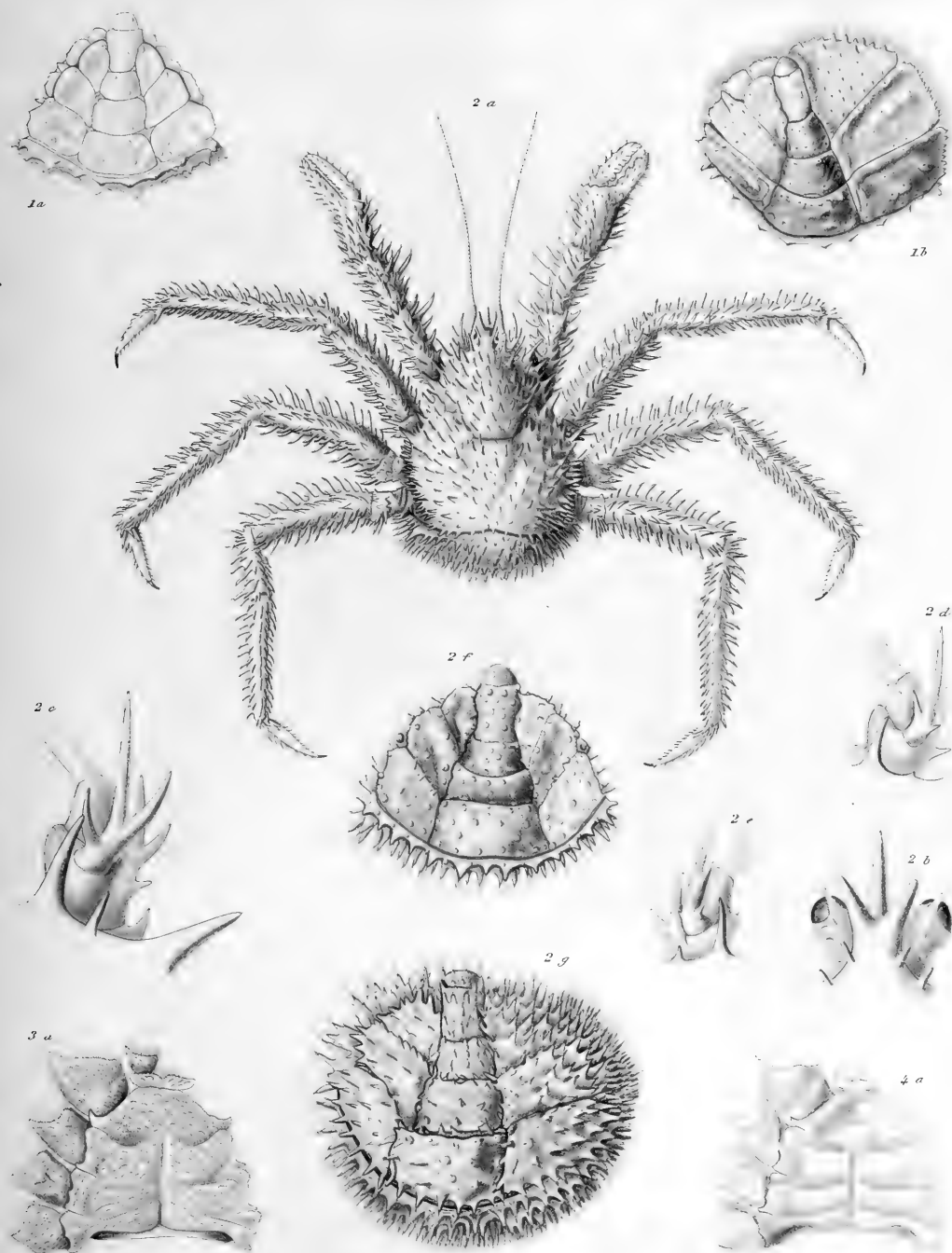


1. *Geryon affinis* A. Milne-Edw. & Bouv. 2. *Cymonomus Normani* Lank.

3. *Paralomis spectabilis* n. sp.



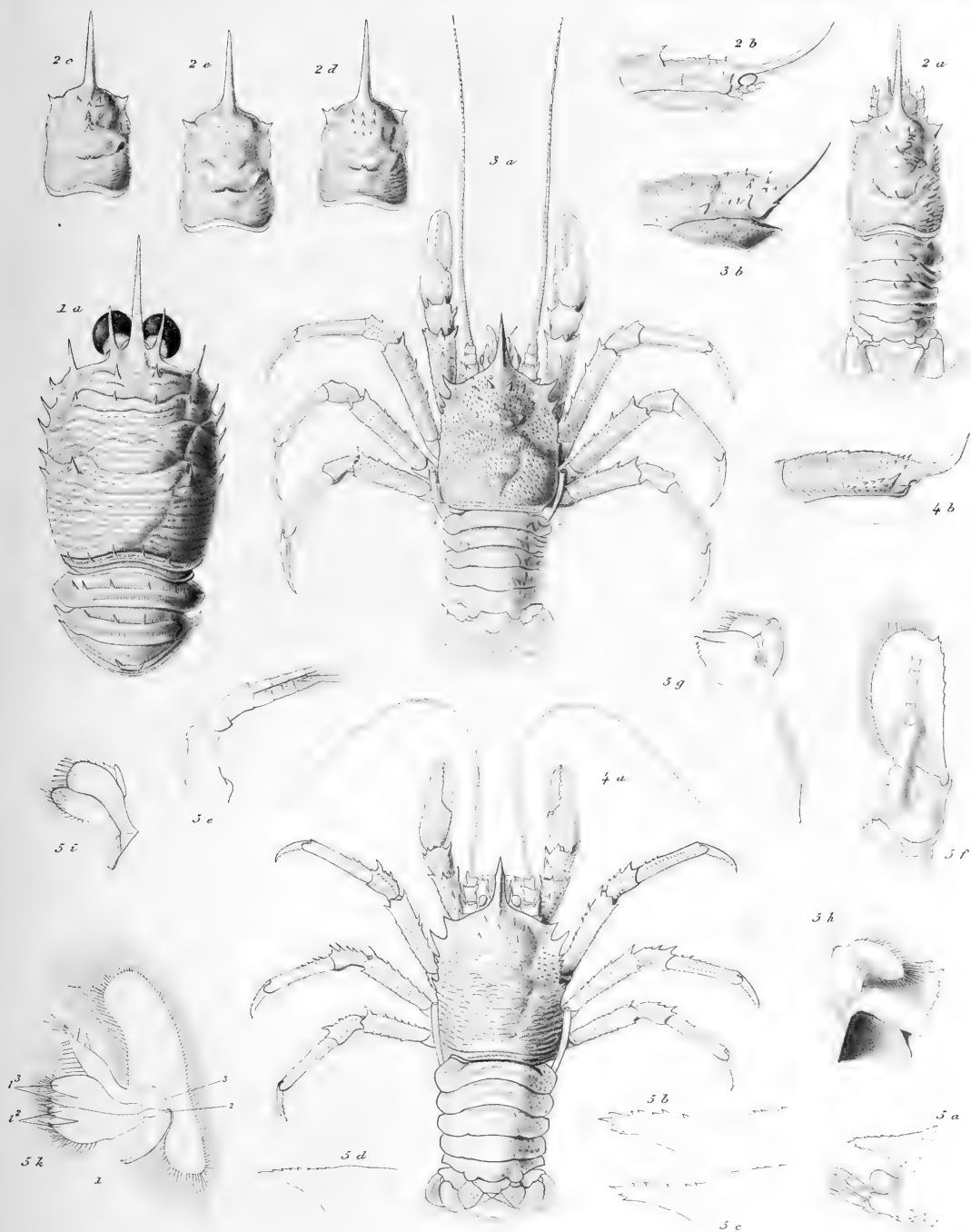




1. *Paralomis spectabilis* n. sp. 2. *P. Bouvieri* n. sp. 3. *Munida barnacka* Penn

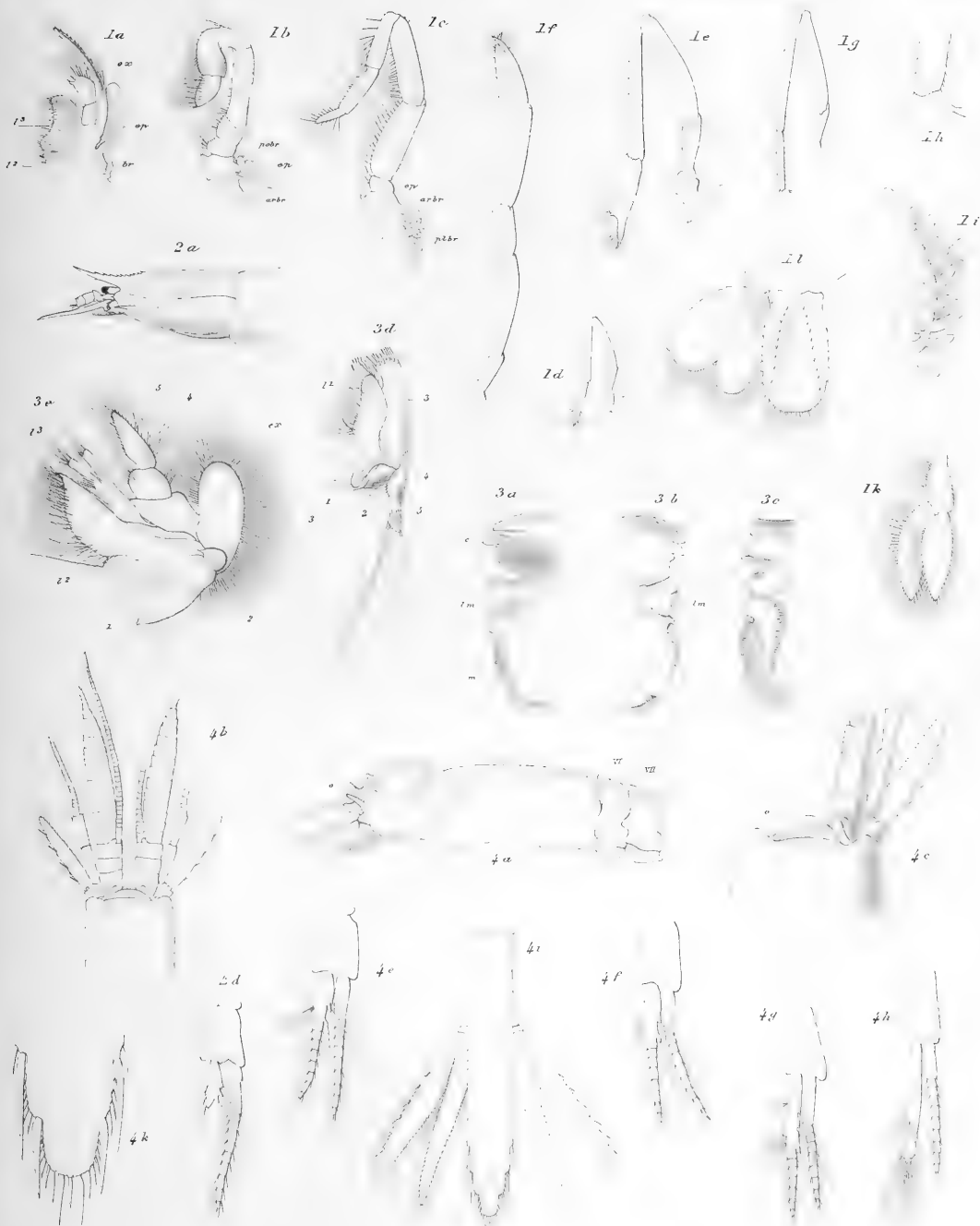
4. *M. tenuimana* G.O.S





1. *Munida tenuimana* c.o.s. 2. *Munidopsis curvirostris* Whit. 3. *M. Antoni* N-Edo. a Boue  
4. *M. similis* Smith. 5. *Spongicoloides profundus* n. gen. n. sp.





1. *Spongicoloides profundus* n. gen. n. sp. 2. *Acanthephyra brevirostris* sp. Bat. 3. *Gnathophausia* Zoea W-S.

4. *Hanczomysis* Fylla H.J.H.





1. *Longithorax fuscus* n. sp. 2. *Pseudomma roseum* C. O. S. 3. *P. frigidum* n. sp.





*Miss Mary Fatherson  
1884 The author's copy*

# THE DANISH INGOLF-EXPEDITION.

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VOLUME III.

3.

## CRUSTACEA MALACOSTRACA. II.

BY

H. J. HANSEN.

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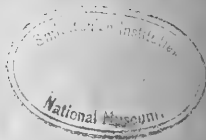
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COPENHAGEN.

PRINTED BY BIANCO LUNO.

1913.





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## Crustacea Malacostraca. II.

By

H. J. Hansen.

### IV. The Order *Tanaidacea*.

#### Introduction.

Before entering on the subject of the present paper I may refer to the "Introductory Remarks" in "Crustacea Malacostraca I" published in 1908, because they contain various statements that need not to be repeated here. In that chapter I explained the limits of the area investigated by the "Ingolf" and other Danish expeditions to our northern dependencies; the principal sources (apart from the "Ingolf") for the material examined were enumerated and the principles followed as to "occurrence" and "distribution" were laid down. Zoologists wishing to get some information on these and allied topics may find them in the paper mentioned.

Our earlier knowledge of the Tanaidacea inhabiting the seas around Greenland, Iceland and the Færoes was poor. Only 9 species were known, 2 of which belong to the family Apseudidae, 7 to the Tanaidae. I am, however, inclined to think that no Carcinologist would have supposed that it might be possible to discover more than ten or fifteen new species within that area. But in the present paper I enumerate 78 species, all, excepting one, captured by Danish expeditions, and 52 of these species are new to science. The "Ingolf" has secured 71 of the species, but of these 13 have besides been taken by another Danish expedition or by two or more zoologists; 3 species have been gathered only by the "Thor" (Dr. Joh. Schmidt), 2 species exclusively by the second Amdrup-Expedition (Mag. sc. Søren Jensen) and a single species by other zoologists. In proportion to the number of species of Tanaidacea hitherto known from Norway, from Great Britain or from all seas together the "Ingolf" collection is so astonishing, that some special reason may be looked for; it may be of interest to attempt a discussion of the topic, and it may be possible to point out some results of more general significance. Finally a treatment of some other results and questions may be inserted before the purely systematic part.

#### On the Literature.

The earlier literature until the year 1881 comprises a good number of papers, but most among them dealing with only a single form or with some few species; the largest and most valuable of these contributions were written by H. Krøyer (1842) and W. Lilljeborg (1865). But in 1881 G. O. Sars published his paper: Revision af Gruppen: *Isopoda chelifera* (Arch. Math. og Naturv. Bd. 7), which is epoch-making in the history of our order. He divided it — he named it a group — into two well-

founded families, Apseudidae and Tanaidae, and pointed out their distinguishing characters; he established nine new genera (only five had been previously described); he enumerated nearly all species described from any ocean, and he added short descriptions of all species seen by him, redescribing a good number of species already made known and establishing twenty-three new species. He enumerated in all 3 genera and 14 species of the Apseudidae, 11 genera with 46 species of the Tanaidae, in all 14 genera with 60 species. But 4 species among the Apseudidae were *nomina nuda* given by Norman, and Sars had overlooked a single species of *Apseudes* established by Willemoës-Suhm and two species of Tanaidae established respectively by Nicolet and Bate. The result is that in 1884 59 species (not counting mere synonyms) of Tanaidacea had been established.

In 1886 G. O. Sars published his important paper: Middelhavets Saxisopoder (*Isopoda chelifera*), which contains elaborate descriptions with numerous excellent illustrations of seventeen species, all briefly described but not figured by him in 1880. And in his splendid work: An Account of the Crustacea of Norway, Vol. II, Isopoda (the parts on the Tanaidacea were edited in 1896—97) Sars published new descriptions and eighteen plates with figures of the Norwegian Tanaidacea, in all 28 species. By the three papers enumerated Sars has laid down a very broad foundation for future study and illustration of the animals, and he has done far more for the furtherance of our knowledge of the order than any other author.

Since 1881 about twenty-four zoologists have published descriptions of new species, sometimes besides of new genera, of Tanaidacea. Among these prominence must be given to the two English zoologists A. M. Norman and T. R. R. Stebbing, because in a valuable paper (On Crustacea Isopoda ... 1886) quoted several times in this report they gave good descriptions with numerous figures of 17 species (1 valid new genus), 13 of which were new and the majority even deep-sea forms; in other papers each of these two authors has described and figured some other forms. — In the Challenger Report Vol. XVII (1886) F. E. Beddard established 4 new genera and 10 new species, most of them interesting antarctic or deep-sea forms; unfortunately his figures are somewhat poor. — A. Dollfus has published preliminary descriptions, with some figures, of about 14 valid new species and 1 new and valid genus; in several papers published in later years Miss Harriet Richardson has established 2 new genera and several new species, mostly American.

In order to arrive at a fair idea of our knowledge of genera and species established before the middle of 1912 I have inspected the Zoological Records since 1877 and besides looked over the vast majority of the papers. I have attempted to count the genera and species hitherto established, excluding of course the synonyms, but it was impossible to arrive at absolute certainty as to the number of species, because in a few cases it cannot be made out whether a species is valid or ought to be cancelled as a synonym, and some few species have been so poorly described that they can scarcely be recognized with any certainty. But I am sure that the following numbers are nearly correct.

The family Apseudidae comprises 8 genera: *Apseudes* Leach with 28 species, *Apseudopsis* Norm. with 2 species, *Parapseudes* Sars with 3 species, *Sphyrapus* Norman with 5 species, *Typhlapseudes* Bedd., *Lciopus* Bedd., *Kalliapseudes* Stebb. and *Pagurapseudes* Whitelegge, each with a single species. In all 42 species.

The family Tanaidae comprises the following genera: *Neotanais* Bedd. (*Alaotanais* Norm. & Stebb.) with 5 species, *Tanais* H. M.-Edw. with 17 species, *Leptochelia* Dana with 16 species, *Heterotanais* G. O. S. with 9 species, *Paratanais* Dana with 9 species, *Nototanais* Richardson with 3 species, *Typhlo-*



*tanais* G. O. S. with 16 species, *Leptognathia* G. O. S. with 14 species, *Pseudotanaïs* G. O. S. with 5 species, *Cryptocope* G. O. S. with 4 species, *Haplocope* G. O. S. with 2 species, *Strongylura* G. O. S., *Anarthrura* G. O. S., *Mesotanaïs* Dollf., *Pancolus* Richardson, *Tanaissus* Stebb., *Tanaella* Norm. & Stebb. and *Bathytanaïs* Beddard, each with a single species. In all 18 genera with 107 species.

Thus the order Tanaidacea comprises 26 genera with about 149 species.

## Results and Questions.

### A. The "Ingolf" Collection.

According to the literature only 9 species have hitherto been known from the coasts of Greenland and the adjacent deep-sea area; the number of deep-sea species secured North of Lat. 56° N. by the English expeditions was small, and the excellent collector of small Crustacea Prof. G. O. Sars captured only 8 species of Tanaidacea during the Norwegian North-Atlantic Expedition. Judging from these and other facts every zoologist would have thought it to be a good result if the "Ingolf" had raised the number of species known from the seas around our northern dependencies to twenty or possibly twenty-five. But as already stated, the "Ingolf" captured 71 species of Tanaidacea, some other expeditions or travellers added 6 species, and a single deep-sea species enumerated in the literature as taken by the "Valorous" within the area in question was not found again. — Besides it may be stated, that a good number of the new species were taken by the "Ingolf" at several stations and sometimes in considerable numbers.

Of the 78 species only 8 belong to the Apseudidae, but 70 to the Tanaidæ. The animals belonging to the Apseudidae are on the whole considerably or much larger than the Tanaidæ and consequently far less overlooked by collectors. But as only 8 species — 3 among them new — of Apseudidae were secured by the "Ingolf" and the "Thor", while 42 species are described in the literature from all seas together, the number of species from our northern area is not even one-fifth of species hitherto established. As to the Tanaidæ the result is very different; 106 species were known from all seas, but the "Ingolf", etc. captured 70 species, thus almost two-thirds as many as hitherto known. And 49 species of the Tanaidæ are new to science.

These excellent results are mainly due to a method of collecting introduced by me during the first "Ingolf" cruise. A considerable quantity of the mud hauled up by dredge or trawl, or the whole bottom material when its quantity was less considerable, was sifted under water in smaller portions in a sieve clothed with silk gauze no. 7 used by millers; the well-sifted contents of the sieve were put in alcohol and later examined at home in small portions, in water or alcohol, on the lower part of a cheese-cover under a moderately magnifying lens. In this way hundreds of small animals, as Tanaidacea, Asellota, etc., were gathered. Other deep-sea expeditions could certainly have arrived at corresponding results if their methods of dealing with the bottom material had been more satisfactory; it may be considered quite certain that hundreds of species of small Crustacea etc. lived in the bottom materials hauled up by the "Challenger" and later great European and North American expeditions and were flushed into the sea again.

### B. Geographical and bathymetrical Distribution.

The fact that the "Ingolf" alone raised the number of species of Tanaidacea inhabiting the area explored from 9 to 72, thus to almost half the number of species known from the entire world, proves with absolute certainty that our knowledge of this order is still in its infancy. But an examination of the list of localities for each species affords further interesting results.

The major part of the 149 species previously known were taken exclusively or generally in depths from 0 to 50 or 60 fathoms, several species generally in depths from 50 to 200 or at most 300 fathoms, and scarcely twenty species — secured mainly by the "Porcupine", the "Valorous", the "Challenger" and "l'Hirondelle" — had been found generally or exclusively in depths more than 300 fathoms, sometimes in more than 1000 fathoms, and the greatest depth recorded is 2050 fathoms. But among the 52 new species established in this report about 44 were taken either most frequently or — and in most cases — exclusively in depths exceeding 300 fathoms and often in depths between 700 and 1870 fathoms. Some species formerly taken in lesser depths were now found to be not uncommon in considerable depths. Thus, the "Ingolf" discovered more than twice as many deep-sea species as hitherto recorded from all seas together, and the great majority among them are small, less than 3.5 mm. and generally 1.6—3 mm. long.

Another point of great interest is that the richest harvest was yielded by some of the deepest stations in the warm area South and West of southern Greenland. At Stat. 78 (South-West of Iceland) an enormous quantity of bottom material was hauled up from 799 fathoms and 9 species of Tanaidacea were found; at Stat. 32 (Davis Strait) the quantity of bottom material from 318 fathoms was very large and rendered 8 species. But at St. 38 (entrance of the Davis Strait) the bottom material procured from 1870 fathoms filled in sifted condition scarcely more than a good tea-cup, and in that I found even 9 species. And two of the stations West of South Greenland were still richer; the sifted material from Stat. 36, 1435 fathoms, was about a liter and contained 11 species, while from Stat. 24, 1199 fathoms, I have 12 species of Tanaidacea. The last-named station thus rendered 4 species more than the whole Norwegian North-Atlantic Expedition, about half as many species as hitherto known from the Mediterranean; the harvest from the four deep-sea localities Stat. 22, 24, 36 and 38 is in all 30 species, while Sars in his standard work from 1896—97 has only 28 species from Norway.

From all these statements we may safely draw the conclusion, that the deep sea with 1100 to 1870 fathoms in the warm area in the North Atlantic has a much richer fauna of Tanaidacea than any large northern or tropical part of the Atlantic along the coasts and with depths from 0 to 100 fathoms. And as it seems very improbable that the deep sea near South Greenland is proportionately richer than the deep sea of the subtropical or tropical Atlantic, the Indian Ocean or the Pacific, we may infer that hundreds of unknown species of Tanaidacea inhabit the deep areas of the Oceans, and that the fauna from about 300 and down to at least 2000 fathoms is much richer than the fauna living in depths between 0 and 300 fathoms.

In the list of the "Ingolf" stations we find thirty places with the temperature at the bottom below zero; these stations belong to the cold deep-sea area and their depth ranges from about 300 to 1300 fathoms. Of our Tanaidacea 8 species are exclusively from these stations. The warm deep-sea

area is more difficult to define, but it may be proposed that the stations with a depth between 300 and 600 fathoms and the bottom temperature not below 3°, and all stations with depth from 600 to 1870 fathoms and the temperature above zero belong to that area. When we adopt this view it will be found that about 38 species enumerated in the following pages were taken exclusively in this warm deep-sea area, which consequently has a much richer fauna than the cold deep-sea area. A somewhat small number of species (*Sphyrapus anomalus* G. O. S., *Pseudotanaïs affinis* H. J. H., *Typhlotanaïs mixtus* n. sp., *Leptognathia longiremis* Lilljeborg, *L. ventralis* n. sp., *L. brevicemis* Lilljebg., *Cryptocope arctica* H. J. H. and *Strongylura cylindrata* G. O. S.) have been taken both in the real cold deep-sea area and at rather deep or very deep stations in the warm area; but with a single exception (*Typhlotanaïs mixtus*) all these species have besides been taken in depths of less than 100 fathoms either by the "Ingolf" or at Norway, at East Greenland or in the Kara Sea. — The majority of the remaining species are forms living in depths less than 300 and frequently less than 100 fathoms. Some few species (as *Leptognathia incrimis* n. sp., *L. Sarsii* H. J. H., *L. subæqualis* n. sp. and *L. latiremis* n. sp.) cannot be referred to any of the three categories just mentioned, but they seem to be essentially cold water forms sometimes found in temperatures a little above zero; *L. subæqualis* was once taken even in 318 fathoms in a temperature of 3.9°.

### C. Sexual Differences in the Tanaidæ.

Adult males of species of the family Apseuidæ are frequently taken together with the females, and I am unable to add anything to our knowledge of the sexual differences in this family. Sars has published excellent figures of both sexes of the two Norwegian species *Apsæudes spinosus* M. Sars and *Sphyrapus anomalus* G. O. S., of *Sphyrapus serratus* G. O. S. and of a few species of *Apsæudes* from the Mediterranean. In the males the abdomen is generally longer in proportion to the thoracic segments, the pleopods and their setæ are longer, the flagella of the antennulæ and antennæ and the endopod of the uropods are longer and divided into a larger number of joints than in the females; furthermore, the chelipeds of the males differ somewhat or very much from those of the females, and sometimes the second pair of thoracic legs show some difference.

As to the family Tanaidæ our knowledge of the males is still very imperfect and some interpretations are erroneous; it is necessary to distinguish sharply between adult and subadult or immature males. Sars has described the females of 26 species of Tanaidæ from Norway, but he was acquainted with really adult males of only 5 species, viz. *Tanaïs Cavolinii* M.-Edw. (*T. tomentosus* Kr., G. O. S.), *Heterotanaïs Oerstedii* Kr., *Typhlotanaïs finmarchicus* G. O. S., *Paratanaïs Batei* G. O. S. and *Leptognathia Sarsii* H. J. H. (*L. longiremis* G. O. S., not Lilljeborg); he described also what he believed to be the males of *Anarthrura simplex* G. O. S. and *Pseudotanaïs forcipatus* Lilljebg., but his animals were only subadult males, not adult specimens, and at least the adult male of the last-named species (already described, without figures, by Lilljeborg) is widely different from the subadult stage. Sars was aware that his males of *Strongylura cylindrata* G. O. S. were "probably" immature, which in reality was the case. In 1885 he figured the adult male of *Cryptocope Vöringii* G. O. S.; in his paper on the Mediterranean forms he figured the adult males of *Leptognathia brevimana* Lilljebg., *Heterotanaïs*

*anomalous* G. O. S. and of species of *Leptochelia*. — Adult males of some few other species have been described by Moore, Stebbing, etc.

A study of Sars' descriptions and figures of adult males as compared with the corresponding females is interesting. In *Tanais Carolinii* M.-Edw. (*T. tomentosus* Kr., G. O. S.) female and male seem to differ only by the chelæ, which in the male are very broad, strongly forcipate and without tubercles on the fingers, while in the female they are rather slender, scarcely forcipate and with two tubercles on the fixed finger. The males of all other above-mentioned forms differ much more from their females. In *Heterotanais Oerstedii* Kr. the male has the cephalothorax produced in a very long and thin "neck", the antennulæ and the antennæ are longer and thinner than in the female, the antennulæ five-jointed in the male, three-jointed in the female, and the chelipeds are quite anomalously shaped in the male, normal in the female. The males known belonging to *Paratanais*, *Typhlotanais*, *Leptognathia* and *Cryptocope* differ from their females in many particulars: the antennæ are six-jointed when three-jointed in the female, seven-jointed when four-jointed in the female, and have besides in all genera tufts of sensory hairs on three of the joints; the thoracic segments are conspicuously shorter in proportion to carapace and abdomen than in the females; the chelipeds or at least the chelæ differ somewhat or considerably in shape and equipment from those of the females: the thoracic legs are somewhat or considerably longer and more slender, the abdomen is larger, its pleopods longer with longer setæ and the uropods at least a little longer than in the females; finally in *Paratanais* the eyes of the males are much larger than in the females. The males of *Leptochelia* differ from their females especially in having much larger eyes, the chelipeds elongate with the chelæ very differently shaped and the antennulæ divided into a good number of joints. (It has been stated that in the males the mouth-parts are generally more or less reduced, but the majority of the males described have not been very closely investigated in that respect).

With a single exception (*Cryptocope Vöringii* G. O. S.) all species of which the adult males are known, inhabit comparatively low water, from the beach down to 30 or 50 fathoms. And according to the sexual differences just pointed out the adult males of most genera differ in general aspect and in several characters more from their own females than from males of other genera, and the differences between the two sexes of the same species are most frequently larger than the differences between the female of that species and females of several other genera. The result is that not unfrequently it is impossible with certainty to refer a male to its female, to determine specimens of the male sex.

While my material of females and immature specimens dealt with in this report is exceedingly large, comprising probably a good deal more than a thousand specimens, I have very few adult males. I establish a new species of *Neotanais* on a male about twice as long as any male or female hitherto known of this family from any sea. Furthermore, I have 5 males belonging to 3 species of *Pseudotanais*, 5 males belonging to 3 species of *Leptognathia* and a male *Cryptocope*, in all 11 specimens referred by me to 7 species; the reference of males to five of these species is absolutely certain, but two are referred with a little less certainty. Finally, I have still two males, one of which with a peculiarly armed chela, but being unable to refer them to genus I found it useless to describe them. But this enumeration of 14 adult males as compared with the enormous number of females and

immature specimens of both sexes proves that adult males must be either very rare or, and much more probably, that they swim about and are therefore rarely taken with the trawl or the dredge.

Immature or subadult males of many species were taken together with the females. In all species with the pleopods quite rudimentary or wanting in full-grown females with or without marsupium such subadult males are instantly recognized by having moderately developed or even somewhat large pleopods; this is the case in several species of *Leptognathia*, in *Pseudotanaïs forcipatus* and *P. Liljeborgii*, in *Agathotanaïs*, *Leptognathiella*, *Strongylura*, *Paranarthrura*. In all these forms the subadult males have the abdomen proportionately either a little or, as in *Paranarthrura insignis* n. sp., considerably longer than the female. In the genera with the antennulæ four-jointed these appendages, and especially their two proximal joints, are generally conspicuously thicker in the subadult males than in the females, and in some species of *Leptognathia* (f. instance *L. armata* n. sp.) the antennulæ of the subadult male are five-jointed, as the fourth joint has its basal part marked off by an articulation. In species of *Pseudotanaïs* or *Leptognathia* with the pleopods well developed in the female and in all species of *Typhlotanaïs* the antennulæ alone afford readily distinguishable differences between females without marsupium and subadult males. In *Typhlotanaïs* the main difference is the thickness of the two proximal joints and of a portion of the third joint; in *Pseudotanaïs* we find generally the basal part of the third antennular joint somewhat thickened and besides protruding below.

It is a common rule that when a good material of full-grown females of a species is to hand, the great majority are without marsupium, even when taken at the same station. But it is a curious fact that in several cases some of the largest specimens without marsupium are a little longer than the longest specimen with marsupium; this fact I cannot explain, but I am induced to think that some reduction in size may accompany the development of the marsupium and the eggs. In females with marsupium the ventral surface of the lamelligerous or of all thoracic segments is rather or quite flat, in specimens without marsupium most frequently considerably convex, but specimens without marsupium are sometimes found showing the ventral surface flat and on the whole showing an appearance as if the marsupial lamellæ had been lost, but whether this has been the case is impossible to decide.

In females without marsupium and subadult males of several species of *Typhlotanaïs* and of *Leptognathia ventralis* n. sp. the second thoracic segment is below, and generally at or not very far from the front ventral margin, produced in a generally acute and sometimes large process directed downwards and more or less forwards; in females with marsupium and in very few cases in female specimens without marsupium (perhaps lost) but with the lower side of the thoracic segments nearly or quite flat this process is either reduced in size and shape (*Leptognathia ventralis*) or lost (*Typhlotanaïs*). — In *Typhlotanaïs microcheles* G. O. Sars females without marsupium and with the ventral side of the thoracic segments convex, the ventral process is found on all thoracic segments excepting on the seventh (vid. "Remarks" on *T. gracilipes* n. sp.) — In *Paranarthrura insignis* n. gen., n. sp., the females without marsupium and subadult males have a conspicuous process on the ventral side of all thoracic segments, but in females with marsupium only the process on the seventh segment has been preserved.

#### D. Some morphological Features in *Agathotanaïs* n.gen.

Among all the new species described in the present paper only one, viz. *Agathotanaïs Ingolfi* n.gen., n.sp. shows hitherto unknown features of more general interest. Both females without marsupium and subadult males are at hand (Pl. VI, figs. 5a—5o). In the female the antennæ consist of a single minute joint (fig. 5c); in subadult males this joint is considerably larger (fig. 5n). In all specimens the seventh thoracic segment and all abdominal segments are immovably fused, but the limits between the segments are tolerably indicated by fine furrows (figs. 5b and 5o). The pleopods are wanting in the female (fig. 5b); in the subadult males they are rather long, unjointed, very slender conical and all coalesced, constituting a kind of pyramid with longitudinal furrows between the pairs, and each pleopod terminates in a few very short setæ (fig. 5o). The uropods are rudimentary, each being a small, subtriangular joint without any distinct division (figs. 5l and 5m).

Among these features the rudimentary state of antennæ and uropods are mere reductions, which yet are much stronger than in any other genus. The fusion of seventh thoracic segment and all abdominal segments is still more interesting. But completely without parallel among Crustacea is the fact, that in the subadult male all five pairs of pleopods are coalesced forming a single somewhat long protuberance, and this fact is of importance for comparison with features found in mouth-parts in a couple of groups of high rank of terrestrial Arthropoda.

#### E. On the naming of Segments and Joints.

Before entering on the systematic part it may be useful to say a little on the counting of the segments and joints and the terms used in the descriptions.

As the first thoracic segment is always fused with the head and hidden beneath the carapace, the apparently first segment is in reality the second, consequently it is here named the second and its legs the second pair, while the first pair of legs, the chelipeds, as belonging to the cephalothorax, are described separately.

The counting of the antennular joints presents no difficulty. But the antennæ are less easy. When the antennæ of females are fully developed they contain seven joints, as is seen in many species of *Leptognathia*. The first joint is very short, frequently nearly triangular, as the posterior margin is oblique and the upper margin very short or wanting; this joint is sometimes difficult to perceive and I never describe it, but it must of course be taken into consideration by counting. The two next joints are somewhat short and the third as a rule shorter than the second; in a couple of species of *Typhlotanaïs* these joints are strongly armed below. Fourth and fifth joints are somewhat long, but frequently, as in *Typhlotanaïs*, in some species of *Leptognathia*, in *Paranarthrura*, etc., fused, constituting a single long or very long joint sometimes with a vestige of division. Sixth joint is well developed, seventh always very small.

The thoracic legs have always the second joint long; the first joint is quite short but most frequently discoverable. The "claw" on the sixth joint is composed of the seventh joint and the real claw, and the limit of suture between these two parts is most frequently distinct. In the descriptions the joints are named according to their real number.

The chelipeds are somewhat difficult. In *Apsudes* a cheliped seems to consist of only five joints instead of seven plus claw. But the presence of an exopod on the first joint proves that it is the second (according to the earlier morphology), and from a comparison with the second pair of legs it is evident that the long joint preceding the chela has been formed by the complete fusion of two joints; finally, the movable finger of the chela answers to the "claw" in the following legs, thus consisting of seventh joint and the real claw. In most genera of Tanaidæ the chelipeds consist of the same five joints as in *Apsudes*, but in several forms, as in the male of *Neotanaïs giganteus*, in *Cryptocope Vöringii* and *C. arcophylax* and above all in *Anarthrura* (comp. Sars' figures) we find a conspicuous piece developed as a separate plate or (in *Anarthrura*) a large real joint between the usual "first" joint and the body; this plate or joint is certainly the real first joint which in most forms of the order is feebly or not marked off from the cephalothorax. As the chelipeds show such tangled morphology I have abstained from applying the counting method when the joints to be described must be indicated. Therefore I use some of the names applied by H. Milne-Edwards to the joints of the legs in Decapoda; whether most of the joints in the legs of Tanaidacea and Decapoda can be considered identical as to morphological value according to their number is another and very difficult question not to be discussed here. The apparently first and very conspicuous joint of the chelipeds in most forms is named the basal; the real first joint in *Anarthrura* and the plate marked off in the forms just enumerated is named the coxal joint. The joint beyond the basal is named the ischium, but in most forms it affords no character worth mentioning. The next joint is named the carpus, though morphologically it answers to meros and carpus; in the descriptions of the chela I speak of hand and fingers, the hand going to the insertion of the movable finger.

#### F. On generic and specific Characters.

In this report I establish only three genera, all belonging to the Tanaidæ. Two of these are well separated, but the third, founded on a single specimen, was established only because it fits badly in the genera known, though it does not seem to possess any single really good generic character. The big genus *Leptognathia* is divided into groups, and in the future it will certainly be divided into three or four genera, but I think it better to postpone this splitting up until a good number of unknown forms have been discovered, because the Carcinologist will then be more able to settle the value of several characters, whether they may be considered of generic or only of specific value. And here we fall in with a difficulty. It is with good reason that Sars laid stress on the mouth-parts in females (and immature males) as affording generic characters and especially on the development of the mandibles and the shape of their molar process, if that is present. But of numerous new species the material is very scanty or even consisting of only a single specimen, and in such cases an examination of the mouth-parts was postponed. Furthermore many species are so small, that several Carcinologists dealing with such animals are scarcely able to dissect the mouth-parts in such a way that a good representation of the mandibles can be given. And by the examination of the mouth-parts in various species of *Leptognathia* I found that two such species as *L. subæqualis* n. sp. and *L. ventralis* n. sp., which are rather allied in most characters and may be referred to the same group, show

in the shape and equipment of the molar processes such differences as those judged by Sars to be of generic value. The result is that the value of the shape of the molar processes as generic characters is lessened both from a scientific and a practical standpoint.

Though the descriptions of species published by G. O. Sars, Norman and Stebbing on the whole must be considered good, some of the characters in the family Tanaidæ used by these authors are scarcely sufficiently sharp, as a larger number of species have been discovered and it can be proved that hundreds of species are still undiscovered. While drawing the figures I found it necessary to use the ocular micrometer very much in order to figure as exactly as possible not only the relative length of the segments and of the joints of all appendages, but besides the exact proportion between length and breadth or depth of the joints of the chelipeds, the antennulæ and the peduncles of the uropods. Very frequently it is stated in the following pages that a joint is somewhat less than twice as long as deep or more than half as long again as another joint, etc., and in all such and several other cases the statements are founded upon measurements. As some slight individual variation exists and in some cases may be more pronounced, the proportions stated may sometimes be only approximative, but in spite of such variation I thought it better to give statements based on measurements than such founded on measuring by the eye.

Especially the relative length and breadth or depth of some of the joints of the chelipeds afford excellent specific characters, but care must be taken that the joints are seen exactly from the side, as an oblique position of a joint produces an erroneous impression as to the relative dimensions. The shape and length of all or of the three proximal joints of the antennulæ are also valuable. The processes on the ventral side of the abdominal segments in *Cryptocope Vöringii* G. O. S. and *C. arctophylax* Norm. & Stebb. were pointed out in the literature, but in many species of *Leptognathia* the presence or absence of ventral tubercles or of a peculiar process afford valuable characters. But it is scarcely necessary to say more on these topics, as the perusal of a few descriptions of species belonging to different genera may elucidate the methods applied.

## Fam. I. Apseudidæ.

This family comprises eight genera, but only two are represented in the collection.

### Apseudes Leach.

In the literature twenty-eight species have been established. The "Ingolf" captured three species, one of which is new; furthermore two species, both new, have been secured by the "Thor".

#### 1. *Apseudes spinosus* M. Sars.

1859. *Rhoëa spinosa* M. Sars, Forh. Vid. Selsk. Christiania for 1858, p. 30.  
 1886. *Apseudes spinosus* Norman & Stebbing, Transact. Zool. Soc. London, Vol. XII, Pt. IV, p. 85, Pl. XVII, fig. 1.  
 ! 1896. — — G. O. Sars, Account Crust. Norway, Vol. II, p. 7, Pls. I—II.



Remarks. As to this species I refer to Sars' description and good figures. It may only be mentioned that the largest of the females measures 13.8 mm. and was taken by the "Ingolf"; the largest male, 12 mm. long, is from Lat.  $60^{\circ}5'N$ .

Occurrence. The "Ingolf" has taken this species at a single station:

West Iceland: St. 87: Lat.  $65^{\circ}02.3'N$ , Long.  $23^{\circ}56.2'W$ , 110 fm.; 7 spec.

The "Thor" has secured it at 3 stations:

South of Iceland: Lat.  $63^{\circ}46'N$ , Long.  $22^{\circ}56'W$ , 80 fm.; 1 spec.

— — — Lat.  $63^{\circ}15'N$ , Long.  $22^{\circ}23'W$ , 114—172 fm.; 5 spec.

South-West of the Færoes: Lat.  $61^{\circ}15'N$ , Long.  $9^{\circ}35'W$ , 400—500 fm.; numerous spec.

Distribution. The species occurs along the whole coast of Norway, from Vadsø to Christiania Fjord, in depths from 30 to 150 fm. (G. O. Sars), and even 180 fm. (Norman). It has been taken off Bohuslän (Lilljeborg), in the eastern part of Kattegat, 17 to 30 fm. and in Skagerak, 70 to 226 fm. (H. J. Hansen). Between the Shetland Islands and Norway it has been taken two times by Cand. mag. Ad. Jensen ("Michael Sars") in 1902: Lat.  $61^{\circ}0'N$ , Long.  $2^{\circ}35'E$ , 150 fm., temp.  $7.9^{\circ}$ , 1 spec., and Lat.  $60^{\circ}5'N$ , Long.  $3^{\circ}42'E$ , 190 fm., temp.  $6.1^{\circ}$ , 21 spec.; the "Thor" secured it near the Orkney Islands: Lat.  $58^{\circ}32'N$ , Long.  $4^{\circ}18'E$ , 150 fm. Tattersall has enumerated it from three places West of southern Ireland and in such depths as 293, 320 and 375 fm., and according to Norman & Stebbing it was taken off S. S. W. Ireland in 725 fm. — According to Norman *Apseudes Kochleri* Bonn., established on a specimen from the Bay of Biscay, is to be cancelled as a synonym to *A. spinosus*; but judging from Bonnier's drawings that reference is still somewhat doubtful.

## 2. *Apseudes vicinus* n. sp.

(Pl. I, figs. 1a—1c.)

Immature Female. Allied to *A. spinosus* M. Sars, but differing in a number of features. — The eye-lobes (fig. 1a) are more produced and more excavated in front than in *A. spinosus*, with the result, that the transverse portion is very short and the outer process long, acute; the lateral process behind the eye-lobe is more conspicuous than in the form mentioned, with the anterior margin somewhat arcuate and the outer angle acute and a little produced. The lateral margin behind last-named process is nearly straight excepting in front. The upper surface of the carapace with the transverse furrow very distinct, long.

The antennulæ in the main as in *A. spinosus*; the first joint with the proximal half of its inner margin serrate; the outer flagellum 8-jointed, the inner 4-jointed and somewhat more than half as long as the outer. Antennæ with the flagellum 7-jointed; the squama reaches the end of the penultimate joint of the flagellar peduncle.

Chelipeds (fig. 1b) nearly as in *A. spinosus*, but the lower margin of the carpus is somewhat longer than that of the ischium while in *A. spinosus* the lower margin of the carpus is shorter than that of the ischium and provided with two teeth not found in *A. vicinus*.

Thoracic segments somewhat longer in proportion to breadth than in *A. spinosus*, and the

lateral margins of the four posterior segments show considerable difference from *A. spinosus*, as in *A. vicinus* the anterior lateral process of each of these segments is much broader at the base, and this proximal part has a short, triangular protuberance both in front of and behind the main part of the process; furthermore the angle in front of the basal joint of each leg is produced into a small, acute protuberance. The ventral surface of the segments with acute processes as in *A. spinosus*. — Second pair of legs (fig. 1c) with a strong spine both from the anterior (upper) and the lower (posterior) angle of fourth joint, with a spine from the upper angle and two spines on the lower margin of fifth joint, while the sixth joint has two spines on the upper and five on the lower margin; fifth joint as long as the sixth and a little shorter than the fourth, while in *A. spinosus* the fifth joint is considerably shorter in proportion to the fourth.

Abdomen scarcely as long as the sum of the three posterior thoracic segments plus half of the fourth. The lateral processes of the five anterior segments somewhat long but distinctly shorter than in *A. spinosus*, the short terminal part of each process is suddenly slender. Sixth segment as long as the three preceding segments and half of the second segment combined, a little more than two and a half times as long as broad at the middle; the major anterior part of each lateral margin with six very feeble protuberances, each bearing a conspicuous seta. (Uropods lost excepting their basal joint.)

Length of the single immature female 6.3 mm.

Remarks. Among the characters enumerated in the description the shape of the eye-lobes, the processes on the lateral margins of the four posterior thoracic segments and the relative length of some of the joints in the chelipeds and second pair of legs are most easily observed.

Occurrence. Only taken by the "Thor" at the following locality.

South of Iceland: Lat. 62° 57' N., Long. 19° 58' W., 505 fm.; 1 spec.

### 3. *Apseudes tenuis* n. sp.

(Pl. I, figs. 2 a—2 e).

Subadult Female. The eye-lobes are strongly produced and acute (fig. 2a), almost as much as in *A. vicinus*. The lateral process of the head shaped nearly as the eye-lobe; the lateral margin behind the last-named process considerably convex. The upper surface of the carapace with the transverse furrow very distinct, long.

The antennulæ more slender than in the preceding species; first peduncular joint more than four times as long as the second and with the proximal half of the inner margin distinctly serrate; the inner flagellum 10-jointed, more than two-thirds as long as the outer which is 13-jointed. — Antennæ (fig. 2a) with the flagellum 9-jointed and the squama not reaching the end of the penultimate joint of the flagellar peduncle.

Chelipeds (fig. 2c) considerably more slender than in *A. vicinus* but conspicuously stronger than in the two following species. Basal joint on the posterior margin with some minute spiniform setæ on the proximal part and somewhat before its end a very protruding angle bearing a strong spine, while the anterior margin is furnished with some setæ; the ischium has two spines near the end of the lower margin; the carpus slender with the lower margin unarmed and more than half as long

again as the lower margin of the ischium. The chela almost four times as long as broad, with the posterior margin slightly concave; the movable finger half as long again as the front margin of the hand.

Thoracic segments (figs. 2a and 2b) a little more slender than in *A. vicinus*; second segment as long as the third. Five posterior segments with their anterior lateral processes in the main shaped as in *A. vicinus*, excepting that their distal part is more slender and generally more produced; a lateral, sharp, triangular protuberance in front of the insertion of the legs on the four posterior segments. — Second pair of legs (fig. 2d) a little more slender than in *A. vicinus*; fifth joint slightly longer than the sixth and as long as the fourth; second joint with a strong spine on the distal lower angle; fourth joint with a long spine both on the upper and the lower distal angle; fifth joint with a terminal upper spine and two strong and distant spines on the lower margin; sixth joint twice as long as broad; with two spines above and six below; seventh joint with a minute tooth below at the middle. Seventh pair of legs (fig. 2e) with second joint nearly five times as long as broad; the following joints are rather slender; sixth joint twice as long as the seventh which is nearly as long as the claw.

Abdomen (fig. 2b) differs somewhat from that in *A. vicinus*. The lateral processes of the five anterior segments are long, distally more slender and directed more obliquely backwards than in that species. Sixth segment a little less than the combined length of second to fifth segment, scarcely less than three times as long as broad at the middle and with six pairs of lateral setæ originating from minute tubercles. — (Uropods lost).

Length of the largest specimen, a female with small marsupial lamellæ, 10 mm.

Remarks. This species is intermediate between the two preceding more robust forms, *A. spinosus* and *A. vicinus*, and the two following very slender species. It is more similar to the latter forms by the slender chelæ, but differs strongly from these and is rather allied to the two first-named species by the long and strong lateral processes on the abdomen, the serrate proximal half of the inner margin of first antennular joint, etc.

Occurrence. The "Ingolf" has taken this species at two deep-sea stations:

Davis Strait: St. 24: Lat. 63°06' N., Long. 56°00' W., 1199 fm., temp. 2.4°; 2½ spec.

Denmark Strait: St. 11: Lat. 64°34' N., Long. 31°12' W., 1300 fm., temp. 1.6°; 2 badly preserved spec.

#### 4. *Apseudes gracilis* Norm. & Stebb.

(Pl. I, figs. 3a—3d.)

1886. *Apseudes gracilis* Norman & Stebbing, Transact. Zool. Soc. London, Vol. XII, Pt. IV, p. 95, Pl. XX.

Subadult Female. As it disagrees with the description and figures of the English authors in some particulars, the more essential features may be mentioned.

The eye-lobes (fig. 3a) have the outer distal angle produced in a thin, moderately short process directed nearly forwards. The lateral processes somewhat small, but otherwise shaped and directed about as the eye-lobes. The surface of the carapace has no transverse furrow.

Antennulæ (fig. 3a) somewhat short; the first joint somewhat short, about two and a half times as long as the second, without serration on the inner margin; the outer flagellum 13-jointed, a little shorter than the sum of the two proximal peduncular joints and four times as long as the short,

3-jointed inner flagellum. — Antennæ with the squama conspicuously shorter than the penultimate joint of the flagellar peduncle; the flagellum 8-jointed.

Chelipeds (fig. 3 b) agreeing with the figure of Norman & Stebbing, thus rather slender and without any spine or tooth on the posterior or lower margin of the joints. Basal joint not fully four times as long as broad; lower margin of the carpus half as long again as that of the ischium. Chela almost three and a half times as long as broad, with the posterior margin somewhat concave; movable finger conspicuously more than half as long again as the front margin of the hand and considerably overreaching the fixed finger, which has the major part of the distal half of its incisive margin finely serrate (fig. 3 c) and a number of setæ inserted on the outer side along the serration.

Second thoracic segment, seen from above (fig. 3 a), has the first joint of its legs triangular with the front margin even sloping a little backwards and the outer angle produced a little forwards; third segment with the outer angle acute and produced slightly forwards. The four posterior segments more slender than in *A. vicinus*; their lateral process proportionately somewhat small with the terminal part thin and no protruding proximal angle in front or behind; each segment furthermore with a small or rather small process on the ventral surface. — Second pair of legs (fig. 3 d) somewhat slender; second joint without any spine at the posterior distal angle; fourth joint even slightly longer than the two following joints combined, without any spine above or below at the end, but with a number of setæ on the upper part of the outer side and along the distal half of the lower margin; fifth joint slightly shorter than the sixth and even slightly broader than long, with a terminal upper spine and two spines on the lower margin; sixth joint distinctly less broad than the fifth, not much longer than broad, with two distal spines above and eight spines along the lower margin; seventh joint with two denticulations below. — (Seventh pair of legs lost in the specimen).

Abdomen about as long as the four posterior thoracic segments combined, slender. Five anterior segments not fully as slender but otherwise shaped nearly as in the following species, thus with the processes from the postero-lateral angles thin and very short, but without processes below. Sixth segment about as long as the sum of the four preceding segments, not fully four times as long as broad, without minute lateral tubercles or setæ. — (Uropods lost).

Length of the specimen described, a female with the marsupial lamellæ very small, 13 mm.

Remarks. The subadult specimen agrees with the description of Norman & Stebbing in some important characters: the antennulæ without serration on the first joint and a very short, 3-jointed inner flagellum (according to the text of the English authors this flagellum is 4-jointed, but the figure has only 3 joints), the antennal squama short, the general shape of the chelipeds with setæ on the fixed finger and no spines on any joint, finally the shape and armature of the joints of second legs excepting that the lower margin of sixth joint has only 8 spines instead of 10. But it differs in several features: the processes of the cephalothorax and thoracic segments are much smaller than according to the English figures, the abdomen has no processes below and no tubercles on the last segment, the movable finger of the chelæ is longer than the fixed, finally some further particulars to be found by a comparison of my text with the description of Norman & Stebbing. I am, however, apt to think that my immature specimen is only a kind of variety of *A. gracilis*, not a separate species, and especially the shape and armature of the joints of second pair of legs bear strong witness for this view.

Together with the specimen described a very young specimen, measuring only 5.7 mm. and with seventh pair of thoracic legs not developed, was taken. It shows several peculiarities due to its very young age, and among these one may be pointed out, viz. that the lower margin of the sixth joint of second legs has only 5 spines; besides it has a spine at the lower distal angle of fourth joint of the same legs, but this feature may be interpreted as variation.

Occurrence: The "Ingolf" has captured this species at a single station.

Denmark Strait: St. 10: Lat.  $64^{\circ}24'N$ , Long.  $28^{\circ}50'W$ , 788 fm., temp.  $3.5^{\circ}$ ; 1 subadult and 1 very young specimen.

Besides the "Valorous" took the species at the following place.

South of Davis Strait: Lat.  $59^{\circ}10'N$ , Long.  $50^{\circ}26'W$ , 1750 fm.

Distribution. According to the English authors quoted this species was taken by the "Valorous" at two stations situated considerably South of the Denmark Strait, viz.: Lat.  $56^{\circ}11'N$ , Long.  $37^{\circ}41'W$ , 1450 fm., and Lat.  $55^{\circ}10'N$ , Long.  $25^{\circ}58'W$ , 1785 fm.

##### 5. *Apseudes gracillimus* n. sp.

(Pl. I, figs. 4a—4e).

Subadult Female. Body and appendages still more slender than in *A. gracilis*. — Cephalothorax nearly as in that species, but the eye-lobes more produced. The carapace without transverse furrow.

The antennulæ (fig. 4a) as long as the carapace and the two anterior free segments combined; first joint slender, about three times as long as the second, without serration on the inner margin. Outer flagellum 17-jointed, about as long as the peduncle and more than two and a half times as long as the 4-jointed flagellum. — The antennæ almost as long as the antennular peduncles; flagellum 8-jointed; the squama reaches beyond the end of the penultimate joint of the flagellar peduncle.

The chelipeds very slender (fig. 4c) and their joints without spines or serration on the lower (posterior) margin. Second joint is considerably curved, long, only a little shorter than the carpus, five times as long as broad; carpus with the lower margin only somewhat less than twice as long as that of the ischium. Chela four times as long as broad, with the posterior margin very concave; the movable finger twice as long as the front margin of the hand and considerably longer than the fixed finger, which has about 4 setæ along the distal half of its incisive margin but no serration or setigerous area.

Second thoracic segment (fig. 4a) has the first joint of the legs triangular with the front margin nearly transverse and only the terminal angle produced slightly forwards as an acute denticle. The four posterior segments have the lateral processes considerably produced, distally slender, acute, and no produced angles from their proximal part; the processes on the lower surface of the segments conspicuous or even rather long. — Second pair of legs (fig. 4d) slender, second joint with a spine on the lower distal angle; fourth joint conspicuously longer than the sum of the two following joints and with a spine on the lower distal angle; fifth joint about half as long again as broad, slightly longer than the sixth, with a terminal spine above and two spines on the lower margin; sixth joint



the distal part of its lower margin, while all adult females of *S. serratus* have three such spines (in a single specimen only two spines on one leg and three on the other); furthermore the basal joint of the antennulæ is a little broader and shorter in *S. anomalus* than in *S. serratus*.

Occurrence. The "Ingolf" has taken this species at eight stations.

Davis Strait:	St. 32: Lat. 66° 35' N., Long. 56° 38' W., 318 fm., temp. 3.9°; 2 spec.
— —	St. 28: Lat. 65° 14' N., Long. 55° 42' W., 420 fm., temp. 3.5°; 2 spec.
— —	St. 25: Lat. 63° 30' N., Long. 54° 25' W., 582 fm., temp. 3.3°; large number of specimens.

West of Iceland: St. 8: Lat. 63° 56' N., Long. 24° 40' W., 136 fm., temp. 6.0°; 2 spec.

South-West of Iceland: St. 85: Lat. 63° 21' N., Long. 25° 21' W., 170 fm.; 3 spec.

East of Iceland: St. 4: Lat. 64° 07' N., Long. 11° 12' W., 237 fm., temp. 2.5°; 1 spec.

North of Iceland: St. 126: Lat. 67° 19' N., Long. 15° 52' W., 293 fm., temp. ÷ 0.5°; 10 spec.

— - — St. 124: Lat. 67° 40' N., Long. 15° 40' W., 495 fm., temp. ÷ 0.6°; 1 young.

Furthermore the species has been taken at East Greenland by two Danish expeditions.

Cape Dalton: Lat. 69° 24' N., ab. Long. 23° 30' W., 9—11 fm., II<sup>d</sup> Amdrup Exp.; large number of specimens.

Lat. 69° 25' N., Long. 20° 1' W., 167 fm., large stones and clay, Ryder Exp.; 1 spec.

Hurry Inlet: Lat. 70° 50' N., Long. 22° 31' W., 10 fm., II<sup>d</sup> Amdrup Exp.; 1 specimen.

Lat. 72° 40' N., Long. 20° 10' W., 100 fm., Ryder Exp.; 1 spec.

Distribution. *S. anomalus* has been captured by Cand. mag. Ad. Jensen ("Michael Sars") at two places North-East and East of the Shetlands Islands: Lat. 61° 40' N., Long. 3° 11' E., 220 fm.; 1 spec., and Lat. 60° 57' N., Long. 3° 42' E., 190 fm., temp. 6.1°; 1 spec. The "Thor" has captured it in the Skager Rak in depths from 280 to 350 fm. Sars has taken it "along the whole Norwegian coast from the Christiania Fjord to Vadsø", in depths "from 100 to 400 fathoms". Finally it is known from the Kara Sea, 50 fm. (Hansen) and from the places South of Novaia Zemlia, between Lat. 70° 20' and 70° 40' N., Long. 54° 08' and 56° 35' East, 61 and 90 meters (Stappers).

According to all these statements *S. anomalus* has been taken a single time in 50 fathoms in the very cold Kara Sea, three times in still lesser depths South of Novaia Zemlia and at numerous places in depths between 100 and 582 fathoms both in the cold area and especially at localities with the temperature somewhat or even considerably above the zero.

#### 7. *Sphyrapus serratus* G. O. Sars.

1881. *Sphyrapus serratus* G. O. Sars, Arch. for Math. og Naturv. B. 7, p. 20.

! 1885. — — — Norske Nordhavs-Exp. Crust. I, p. 66, Pl. XXI.

The differences between this species and *S. anomalus* have been pointed out above.

Occurrence. The "Ingolf" has captured *S. serratus* at five stations, all in the cold deep-sea area.

North of Iceland: St. 124: Lat. 67° 40' N., Long. 15° 40' W., 495 fm., temp. ÷ 0.6°; 1 spec.

— - — St. 125: Lat. 68° 08' N., Long. 16° 02' W., 729 fm., temp. ÷ 0.8°; 1 spec.

South of Jan Mayen: St. 119: Lat.  $67^{\circ} 53' N$ , Long.  $10^{\circ} 19' W$ , 1010 fm., temp.  $\div 1.0^{\circ}$ ; 4 spec.

— - — St. 117: Lat.  $69^{\circ} 13' N$ , Long.  $8^{\circ} 23' W$ , 1003 fm., temp.  $\div 1.0^{\circ}$ ; 4 spec.

— - — St. 113: Lat.  $69^{\circ} 31' N$ , Long.  $7^{\circ} 06' W$ , 1309 fm., temp.  $\div 1.0^{\circ}$ ; 4 spec.

Besides this species has been taken by the Norwegian North-Atlantic Expedition at two stations between Norway and Iceland in 1163 fm. and 1215 fm. and the temperatures were  $\div 1.1^{\circ}$  and  $\div 1.2^{\circ}$ ; besides it was taken West of Spitzbergen: Lat.  $77^{\circ} 58' N$ , Long.  $5^{\circ} 10' E$ , 1333 fm., temp.  $\div 1.4^{\circ}$  (Sars).

*S. serratus* has thus been captured in all nine times, and always in temperatures somewhat or considerably below zero.

#### 8. *Sphyrapus tudes* Norm. & Stebb.<sup>1)</sup>

1886. *Sphyrapus tudes* Norman & Stebbing, Trans. Zool. Soc. London, Vol. XII, Pt. IV, p. 99; Pl. XXII, fig. 1.

This very characteristic species has been well described and figured by the English authors.

Occurrence. *S. tudes* has not been taken by the "Ingolf" but at two localities by the "Thor".

South-West of the Færoes: Lat.  $61^{\circ} 15' N$ , Long.  $9^{\circ} 35' W$ , 475 fm.; 26 spec.

— - - — Lat.  $61^{\circ} 7' N$ , Long.  $9^{\circ} 30' W$ , 440 fm.; 22 spec.

Distribution. This species was taken by the "Porcupine" South of Rockall: Lat.  $56^{\circ} 13' N$ , Long.  $14^{\circ} 18' W$ , 420 fm. (Norman & Stebbing).

## Fam. II. Tanaidæ.

This family comprises eighteen genera hitherto established; twelve of these are represented in the "Ingolf" material, and three new genera are established.

### *Neotanais* Beddard.

(*Alaotanis* Norm. & Stebb.).

This genus, which contains some of the largest forms of the family, comprises five species already established. The "Ingolf" collection contains two species, one of which is new, but a third species is enumerated below because it was taken by an English expedition near the entrance of the Davis Strait.

#### 9. *Neotanais serratispinosus* Norm. & Stebb.

(Pl. I, figs. 6a—6b; Pl. II, figs. 1a—1c).

1886. *Alaotanis serratispinosus* Norman & Stebbing, Trans. Zool. Soc. London, Vol. XII, Pt. IV, p. 111; Pl. XXIII, fig. 1; Pl. XXIV, fig. 1.

<sup>1)</sup> The fourth species of this genus, *Sphyrapus malleolus* Norm. & Stebb., can scarcely be included in this report, as it has not been taken by any Danish expedition, and the most northern among the localities enumerated by the English authors is at Lat.  $57^{\circ} 11' N$ , Long.  $37^{\circ} 41' W$ , thus South-East of Cape Farewell, but about 12 geographical miles South of the area dealt with in the present paper.



Norman & Stebbing have published a good description and a number of figures of this characteristic species. The single adult specimen at hand, a female with the marsupium fully developed, measures 6.7<sup>mm</sup> in length, and is somewhat smaller than the largest specimen seen by the English authors, as they stated it to be 8.5<sup>mm</sup> long. My specimens agree well with their description, but I think it useful to give some analytical figures with some remarks.

The chelæ (fig. 6a) are somewhat longer than the carpus, a little more than twice as long as broad, with the posterior margin considerably sinuate, as almost its proximal half is conspicuously concave, the distal half rather convex. The movable finger is somewhat shorter than the front margin of the hand; its incisive margin is armed with six low to extremely low teeth (fig. 6b) increasing much in breadth from the proximal to the penultimate tooth and decreasing much in height from the first to the last tooth; each tooth has its distal end produced into a minute, oblong-triangular, acute tip. The fixed finger has its terminal part bent considerably and shaped as a thick, somewhat spiniiform process with the margins glabrous, while the remaining long part of the incisive margin has almost its proximal half furnished with a close row of numerous very small teeth and the distal portion with five large, very broad and proportionately somewhat low, obtuse, brownish teeth.

Fig. 1a represents the terminal part of third left thoracic leg from behind; some nine long, glabrous and strong setæ originate in an oblique row from the margin of sixth joint, which above terminates in three very thick, serrate spines; seventh joint, seen in the intervals between the setæ, is distally slender and three times as long as the straight claw. — Fig. 1b represents the terminal part of sixth left leg from behind, and fig. 1c the corresponding part of seventh left leg from above; the last-named part has a transverse row of spines above the base of the long setæ at the end of sixth joint; in both legs the seventh joint is distally a little flattened and widened towards the rounded end which expands as a roof beyond the insertion of the claw; the distal part of seventh joint is closely serrate along the terminal margin and the most distal portion of the lateral margins, and from this serration to near the middle of the joint each lateral margin has a very close row of minute, very slender spines; the claw is half or more than half as long as seventh joint.

Occurrence. This fine species was taken by the "Ingolf" at a single station.

South of Greenland: St. 22: Lat. 58° 10' N., Long. 48° 25' W., 1845 fm., temp. 1.4°; 3 spec.

Distribution. Norman & Stebbing examined specimens from a station South of Greenland at Lat. 56° 11' N., Long. 37° 41' W., 1450 fm., and from two localities respectively North-West of Ireland and West of North Ireland, 1360 and 1380 fm.

#### 10. *Neotanais hastiger* Norm. & Stebb.

1886. *Alaotanais hastiger* Norman & Stebbing, Trans. Zool. Soc. London, Vol. XII, Pt. IV, p. 1103; Pl. XXIII, fig. 2.

Occurrence. This species, which has not been gathered by any Danish expedition and has never been seen by me, is enumerated here because the single specimen hitherto known has been taken by the "Valorous" at a locality not far from the "Ingolf" St. 38 and between this station and Cape Farewell, viz. at Lat. 59° 10' N., Long. 50° 25' W., 1750 fm.

11. *Neotanais giganteus* n. sp.

(Pl. II, figs. 2a—2h.)

Adult Male. Carapace nearly as long as the three following segments combined, seen from above peculiarly shaped (fig. 2a), as scarcely its front half has the lateral margins feebly convex and is only a little longer than broad, while the major posterior part is laterally considerably expanded, but the postero-lateral area of this part is subquadrangular, well marked off by a suture and must be considered the coxal joint of the chelipeds. A portion of each lateral margin somewhat behind the front angle is furnished with a close row of outstanding, stiff setæ (fig. 2b).

The ocular plate is well marked off (fig. 2c), nearly ovate, with the end subacute and without any vestige of visual elements. — The antennulæ (fig. 2b) are somewhat longer than the carapace, 7-jointed; the first joint is very long, as long as the other joints combined, seen from above with the inner margin straight, the major proximal part of the outer margin distinctly concave, but the distal part of this margin somewhat convex and bearing a close longitudinal row of horizontal, stiff setæ. Second joint almost as thick, but somewhat less than half as long, as the first, with a shorter row of stiff, horizontal setæ on the outer margin. Third joint is short and rather thick; fourth joint is somewhat shorter than the second, tapers much towards the end and has on the outer side a long row of long sensory hairs; fifth and sixth joints, and especially the last-named, are short, and seventh joint is extremely short. — The antennæ (fig. 2c) 9-jointed; second, fourth and fifth joints long; third joint a little longer than deep; sixth joint a little shorter and considerably thinner than the fifth; seventh and especially eighth joint somewhat shorter and thinner than the sixth, and ninth joint short and very thin.

The chelipeds (fig. 2d) are robust. The coxal joint is mentioned above. The basal joint is moderately short but extremely thick, its whole lower side being produced downwards as a long, thick and rounded protuberance. The carpus is long, almost three times as long as deep, and the proximal third of its lower margin is deeply concave. The chela is a little longer than the carpus, two and a half times as long as broad; the movable finger, which is much curved near the middle and somewhat shorter than the strongly convex anterior margin of the hand, has almost the proximal half of its incisive margin serrate and a strong, triangular tooth considerably beyond the middle. The fixed finger has on the incisive margin near its middle a long, straight, subcylindrical, distally rounded process, and near the base a broad protuberance with two small incisions. The fingers cross each other greatly, while a large interval is left between their major proximal part.

The thoracic segments subsimilar in shape, length and breadth (fig. 2a), excepting the seventh segment which is somewhat shorter; the lateral margins of the segments are very convex. — The legs are moderately slender and somewhat long, all subsimilar, the only exception being that the real claw is extremely short on the anterior pairs (fig. 2f), a little longer on the posterior pairs (fig. 2g). Third joint is extremely short, fifth joint a little longer than the fourth, a little shorter than the sixth (fig. 2e), and the distal half of its lower side is furnished with a number of setæ; sixth joint has the distal half of the lower margin and the end set with a good number of setæ; seventh joint with claw much shorter than sixth joint.

The abdomen as long as the sum of the four preceding segments; its four anterior segments are broader than the thorax; the pleopods are strongly developed. Sixth segment not quite as long

as the two preceding segments combined, somewhat narrower than fifth segment, and posteriorly emarginate. — Uropods (figs. 2 a and 2 h) slightly shorter than the abdomen; peduncle about two and a half times as long as broad; endopod very long with thirteen joints, the first joint conspicuously thicker than the second and third and as long as these two combined; exopod very small, two-jointed, with the proximal joint shorter than the distal.

Length 20<sup>mm</sup>.

Remarks. Though new species of this family as a rule ought not to be founded on adult males, I venture to establish a new species on the specimen described, because it is not only characteristic but very much larger than any specimen of Tanaidæ hitherto captured. The animal when hauled up from the sea was quite white.

Occurrence. The "Ingolf" has taken this species at a single station.

Davis Strait: St. 36: Lat. 61° 50' N., Long. 56° 21' W., 1435 fm., temp. 1.5°; 1 spec.

### <sup>r</sup> **Heterotanaïs** G. O. S.

Of this genus nine species have been established. The material at hand contains only a single probably new species.

#### 12. **Heterotanaïs groenlandicus** n. sp.

(Pl. I, figs. 5 a—5 g.)

1887. *Heterotanaïs limicola* H. J. Hansen, Vidensk. Medd. Naturh. Forening i København for 1887, p. 178 (Probably not *H. (Paratanaïs) limicola* Harger).

Female. The body (fig. 5 a) about six times as long as broad. — Carapace only a little longer than the two anterior thoracic segments combined, a little longer than broad, anteriorly not fully half as broad as somewhat before the posterior margin (fig. 5 b).

The eye-lobes are considerably produced, distally not angular but rounded (fig. 5 c); the eyes are moderately large, black, but the black pigment renders it impossible to count the ocelli, a couple of which are seen at the hind margin of the black spot. — The antennulæ (figs. 5 a and 5 c) are a little shorter than the carapace, somewhat slender; first joint somewhat longer than the two others combined, almost four times as long as deep; third joint about twice as long as the second. — Antennæ somewhat slender; fourth joint (formed by fusion of fourth and fifth joints) only as long as the two preceding joints combined.

The chelipeds (fig. 5 c) are somewhat robust; the carpus is almost twice as long as deep. The chela is somewhat longer than the carpus and somewhat more than twice as long as broad; the movable finger is much shorter than the hand; the fixed finger (fig. 5 d) is somewhat expanded on the incisive side with about three low protuberances and near the end rather broad and distally rectangular, while the very short apical part of the finger is slender and marked off from the inner expansion.

Second pair of legs (fig. 5 c) with a very long seta from the upper distal angle of fifth joint; sixth joint about as long as fifth and fourth joints combined and a little shorter than seventh joint with claw; seventh joint a little shorter than the claw. Third pair of legs (fig. 5 e) have the seventh

joint and the claw about equal in length and together conspicuously more than half as long as the sixth joint. Seventh pair of legs (fig. 5f) with the second joint proportionately somewhat slender, four times as long as broad.

Abdomen scarcely or slightly broader than the thorax. — Uropods a little more than half as long as the abdomen; the endopod five-jointed (fig. 5g), but sometimes the first joint is divided again into two joints by a less conspicuous suture, and the relative length of the joints shows considerable variation; exopod as long as or longer than the first joint of the endopod, two-jointed.

Length of a female with marsupium 2.9 mm.

Remarks. In the above-named paper I had referred specimens of this species to *Heterotanais* (*Paratanais*) *limicola* Harger, though, as may be seen in the paper, I was well aware that Harger's description of the eyes did not agree with my specimens. Harger said that "the eyes are small and inconspicuous", while in the specimens seen by me the eyes are of considerable size, black and consequently very conspicuous, and having examined a large number of species of this family I am now inclined to think that the difference mentioned is a specific character. Harger's figures of his *H. limicola*, especially that of the cheliped, are too small for forming a judgement of some particulars. — *H. groenlandicus* differs in several important features from *H. Oerstedii* Kr., in which the eye-lobes are subacute, the third antennular joint not much longer than the second, the carpus and the chela of the chelipeds considerably thicker and the endopod of the uropods only four-jointed.

Occurrence. The "Ingolf" gathered this species at a single locality.

West coast of Greenland: Mouth of Ameralik Fjord, Godthaab (about at Lat. 64° 11' N.), 5—70 fm., shells; 25 spec.

The Copenhagen Museum possesses specimens from a few places in West Greenland, viz. Proven (Lat. 72° 23' N., Long. 55° 23' W.), 1 spec.; Jakobshavn (Lat. 69° 13' N., Long. 51° 0' W.), 1 spec. (brought home by Mag. Traustedt); Godthaab, 10 spec. found between numerous specimens of the genus *Metopa* dredged in "deep water" (probably 40—60 fm.) where the bottom was clothed with *Sertularia*.

Distribution. Apart from West Greenland this species has not yet been recorded.

### <sup>3</sup> *Tanais* H. Milne-Edw.

Of this genus seventeen species have been established, but only a single form is known from our northern area.

#### 13. *Tanais Cavolinii* H. Milne-Edw.

- |         |                          |  |
|---------|--------------------------|--|
| 1829.   | <i>Tanais Cavolinii</i>  | H. Milne-Edwards, in Audouin and Milne-Edwards: Précis d'Entomologie, I, Pl. XXIX, fig. 1 (Quoted from Miss Harr. Richardson). |
| ! 1842. | <i>Tanais tomentosus</i> | Kröyer, Nat. Tidsskr. B. IV, p. 183.   |
| ?       | —                        | Kröyer, Voy. en Scand. Crust., Pl 27, fig. 2 a—q.  |
| 1847.   | —                        | Kröyer, Nat. Tidsskr. Ny R., B. II, p. 412.  |
| ! 1896. | —                        | G. O. Sars, Account Crust. Norway, Vol. II, p. 12, Pl. V.  |

1899. *Tanaïs Cavolinii* A. M. Norman, Ann. Mag. Nat. Hist. Ser. 7, Vol. III, p. 332.  
 1905. — — Harr. Richardson, Mon. Isop. North America, Bull. U. S. Nat. Mus. No. 54, p. 8.

The tangled synonymy of this well-known species is found in Norman's and Miss Richardson's papers.

Occurrence. The "Ingolf" secured this species at a single locality.

Færoes: Trangisvaag, between algæ at the shore. Many specimens.

In the paper on the Malacostraca from West Greenland I stated that a specimen with the label: "Greenland, Krøyer's effects", was preserved in the Copenhagen Museum; for this reason I mentioned the species, but did not number it, as I feared that the statement was not quite certain. Nevertheless Norman and other authors have on my authority included "Greenland" in the enumeration of the distribution of the species. But as *T. Cavolinii* has not been found at Iceland and has not in recent time been captured at Greenland I am now nearly sure that the species does not live at the last-named country.

Distribution. This species is known from Øresund (Krøyer), the western coast of Norway northwards to Lat. 63°20' N. (G. O. Sars), Scotland northwards ab. to Lat. 56½° N. (Norman), England and Ireland (several authors), the Channel Islands (various authors), West France (Chevreux), many places in the western half of the Mediterranean (several authors), Azores (Barrois); finally Connecticut, Long Island Sound and Castle Harbour, Bermudas (H. Richardson). It lives always in quite shallow water, from the beach down to a few fathoms.

#### <sup>†</sup> **Pseudotanaïs** G. O. S.

Of this genus five valid species have been established; four of these are boreal or arctic, while the fifth species is only known from the Mediterranean. The "Ingolf" captured six species, three of which are new.

This genus differs materially from all other genera by having fifth and sixth thoracic segments very long as compared with the fourth segment and especially with third and second segments. It is placed here because in some other features it is intermediate between *Tanaïs* and *Paratanaïs*—*Typhlotanaïs*. It agrees with *Tanaïs* and differs from the other genera in possessing only a single pair of marsupial lamellæ; as to antennulæ, antennæ, uropods and development of second pair of legs as compared with the following pair it agrees on the whole with *Paratanaïs*—*Typhlotanaïs*; as to the mouth-parts — mandibles and maxillipeds — it differs strongly from the genera named and is more related to *Leptognathia*, though showing peculiarities not found in the last-named genus.

#### 14. **Pseudotanaïs forcipatus** Lilljeborg.

(Pl. II, figs. 3 a—3 e).

1864. *Tanaïs forcipatus* Lilljeborg, Bidrag till kännedomen om de inom Sverige och Norrige förekommande Crust. af .... Tanaidernas familj, p. 16 (Female and Male).  
 ! 1897. *Pseudotanaïs forcipatus* G. O. Sars, Account Crust. Norw., Vol. II, p. 40; Pl. XVII, fig. 1 (Female and subadult Male).

1907. *Pseudotanaïs forcipatus* Vanhöffen, Zool. Jahrbücher, Abth. für Syst., Bd. XXV, p. 511; Taf. 20, fig. 10—12 (Adult Male).

Female. Sars has published a good description with numerous figures of this sex. To his description may be added that the front margin of the head, seen from above, is shaped as in *P. Lilljeborgii* (comp. fig. 5a), thus nearly transverse, feebly convex at the middle, not emarginate at the antennulæ, and the antero-lateral angles not produced.

The female is readily distinguished from the other northern species, excepting *P. abyssi* n. sp., by the strongly forcipate chelæ; from *P. abyssi* it is separated by having no pleopods, the uropods much shorter, the antennulæ and the walking legs shorter and thicker, etc.

Subadult Male. It has been figured and mentioned by Sars, who erroneously considered it the adult male. It agrees with the female in the shape of the chelæ, the antennulæ, the distal joints of the thoracic legs, etc., but it differs in three features: fourth and fifth thoracic segments shorter, but abdomen proportionately longer and thicker than in the female, and the pleopods well developed with long setæ. — In younger male specimens the thoracic and abdominal segments are more similar to those of the female, while the pleopods are smaller with the setæ short.

Adult Male. Almost fifty years ago Lilljeborg published a brief description in the Swedish language of this sex, but did not figure it, and some five years ago Vanhöffen (l. c.) pointed out the main differences between female and adult male, with three analytical figures of male appendages. A more full description may be given here.

The anterior end of the head about half as broad as the carapace (fig. 3a); the front margin is deeply emarginate at the base of each antennula (fig. 3c) and the antero-lateral angles considerably produced with the end blunt; in a lateral view (fig. 3b) the head is produced forwards covering the base of the outer side of the antennula as a rounded plate.

The antennulæ are seven-jointed (figs. 3b and 3c); the two proximal joints are very thick, subequal in length and together a little longer than the five others combined; third joint broad and a little longer than the two next joints combined; fourth joint very short, with a tuft of sensory hairs on the lower distal angle; the four distal joints increase considerably in length and decrease in thickness from the fourth to the seventh; fifth and sixth joints with some sensory hairs at the outer distal angle; seventh joint considerably longer than the sixth.

The chelæ (fig. 3b) are a little more than twice as long as broad and differ much from those of the female; the fixed finger at the base twice as broad as the movable, but the major distal part of its incisive margin is so concave, that a conspicuous interval is seen between the fingers when their terminal parts cross each other. The movable finger is evenly curved, somewhat longer than the front margin of the hand; the inner surface of the hand has above the insertion of the movable finger a transverse row of about nine peculiar setæ.

Fifth thoracic segment (fig. 3a) a little shorter than the two preceding segments combined and as long as sixth segment. The thoracic legs are conspicuously more slender than in the female. Second pair have the seventh joint with claw longer than sixth joint; third and fourth pairs with the spurs short and simple, while their seventh joint plus claw is only a little shorter than sixth joint; on the three posterior pairs (fig. 3d) seventh joint together with its claw is much longer

than in the female, about as long as the sixth joint, and the claw is conspicuously longer than seventh joint.

Abdomen much larger in proportion to the thorax than in the female, as long as the sum of the four posterior thoracic segments; sixth segment (fig. 3 e) produced considerably backwards, much longer than in the female and with the hind margin deeply emarginate, while the postero-lateral angles are scarcely rounded. — Pleopods about as in the female *P. abyssi*, with moderately narrow rami and the setæ very long. — Uropods (fig. 3 e) in the main as in the female, but a little more slender, and one of the terminal setæ of the endopod extremely long.

Length of two males 1.25 and 1.40 mm.

Occurrence. The "Ingolf" has taken this species at two localities.

West Greenland: Inner end of Ameralik Fjord, Godthaab, muddy bottom; 43 specimens, 2 of which are adult males.

North of Iceland: St. 128: Lat. 66° 50' N., Long. 20° 2' W., 194 fm., temp. 0.6°; 4 spec.

*P. forcipatus* has besides been captured by other collectors at the following five localities within our area.

West Greenland: Karajok Fjord, ab. Lat. 70° 20' N.; many spec. Vanhöffen.

East Iceland: Faskrud Fjord, 20—50 fm.; 1 spec. Mag. sc. R. Hørring.

East Greenland: Cape Dalton, Lat. 69° 24' N., 9—11 fm.; 5 spec. (♀ and ♂). II<sup>d</sup> Amdrup Exp.

— Turner Sound, Lat. 69° 44' N., 3 fm.; 8 spec. II<sup>d</sup> Amdrup Exp.

— Denmark Isl., Lat. 70° 27' N., Long. 26° 12' W., 10 fm., clay; 2 spec. Ryder Exp.

— several spec. Ryder Exp.

Distribution. This species has been established on specimens taken off Bohuslän in 50—60 and 120—130 fm. In the Danish seas it has been taken four times, viz. two times in the south-western Kattegat, 13 and 15 fm., and two times in Skagerak, in 70 and 125 fm. (H. J. Hansen). According to Sars it has been found along the whole Norwegian coast northwards about to Lat. 70° N. Furthermore it was captured in Klosterelv Fjord, East Finmark, close upon the frontiers of Russia (A. M. Norman), in the Barents Sea at Lat. 76° 26' N., Long. 60° 55' N., vertical pelagic haul from 30 to 0 meter (Stappers) and at Northbrook Island, Franz Joseph Land, 10 fm. (Th. Scott). Finally it is known from some localities in the northern Scotland, in 8—10 and 50—55 fm. (Th. Scott).

This species is thus boreal and arctic and lives in very moderate depths, from some few fathoms and down to nearly 200 fathoms.

#### 15. *Pseudotanaïs abyssi* n. sp.

(Pl. II, figs. 4a—4i.)

Female. The body of the females with marsupium (fig. 4a) somewhat more than three times as long as broad; in the immature female it is conspicuously more slender. — Carapace, seen from above, with the lateral margins considerably convex excepting near the front end and two and a half times as broad as this front end; the anterior margin feebly concave behind the antennulæ, feebly produced at the middle and at the lateral angles. — Eyes wanting.

The antennulæ (figs. 4a and 4c) as long as the carapace, the second segment and half of the

third segment combined, rather slender. First joint, seen from the side, not fully five times as long as deep, decreasing conspicuously in depth from the base towards the middle and somewhat longer than the two other joints combined; third joint only a little longer than the second. — Antennae (fig. 4 c) moderately slender; second and third joints without any spine at the distal upper angle; fourth joint (in reality formed by a fusion of fourth and fifth joints) two and a half times as long as the penultimate joint.

Chelipeds (fig. 4 d) somewhat slender. Carpus conspicuously longer than the basal joint, two and a half times as long as deep. Chela much longer than the carpus, nearly two and a half times as long as broad, with the posterior margin feebly concave; the fixed finger only slightly broader than the proximal part of the movable and keeping the same breadth from near the base to the middle; the movable finger is conspicuously longer than the front margin of the hand, moderately slender, with the major part of its incisive margin almost convex, at the base far from touching the fixed finger, so that the fingers, when their distal parts are crossed, are very forcipate, leaving a considerable triangular interval between their proximal halves.

Fifth thoracic segment (fig. 4 b) as long as the sum of the three preceding segments and scarcely or slightly longer than the sixth segment. — The thoracic legs are slender and somewhat long. Second pair (fig. 4 e) with sixth joint a little shorter than fourth and fifth joints combined (the articulation between these two joints forgotten on the figure) and almost half as long again as seventh joint with claw, and seventh joint itself is much shorter than the claw. Third pair (fig. 4 f) with the sixth joint not quite half as long again as the fifth and twice as long as seventh joint with claw; seventh joint and claw equal in length; spur on fifth joint moderately slender, not expanded; considerably less than half as long as sixth joint. Three posterior pairs of legs (fig. 4 g) with second joint long and slender, sixth joint a little longer than the fifth, seventh joint rather short, claw extremely short; the spur slender and only about as long as the diameter of the joint.

The abdomen somewhat longer than the sum of the two preceding segments (fig. 4 a). Pleopods well developed; their rami with very long setae (fig. 4 h). — Uropods somewhat long (fig. 4 i); endopod with the proximal joint a little longer than the distal; exopod slender, reaching a little or somewhat beyond the end of the first joint of the endopod, and its two very distinct joints subequal in length.

Length of a female with the marsupium half developed 1.17<sup>mm</sup>.

Remarks. This small species agrees with *P. forcipatus* in having no eyes and the chelae strongly forcipate, but it differs from it in several features, especially in possessing well developed pleopods with long setae, longer uropods, longer and more slender chelipeds and legs. *P. abyssi* bears some resemblance to *P. oculatus* n. sp., but the latter differs in having distinct ocelli, the chelae conspicuously less forcipate, the exopod of the uropods longer and in several particulars in the legs. From the other northern species of the genus *P. abyssi* differs greatly, above all in having the chelae strongly forcipate.

Occurrence. The "Ingolf" secured this species at a single station.

Davis Strait: St. 36: Lat. 51° 50' N., Long. 56° 21' W., 1435 fm., temp. 1.5°; 3 spec. (2 are females with the marsupium half developed).



16. *Pseudotanaïs Lilljeborgii* G. O. Sars.

(Pl. II, figs. 5a—5g.)

1881. *Pseudotanaïs Lilljeborgii* G. O. Sars, Arch. for Math. og Naturv. B. 7, p. 48.

! 1897. — Lilljeborgi — Account Crust. Norw., Vol. II, p. 40; Pl. XVII, fig. 2.

Female. Sars has described and figured the female, while he has not seen any immature or adult male. But his representation of the front end of the head with the eyes is not quite correct. My fig. 5a represents the outline of the carapace with the right antennula; it is seen that the carapace is about two and a half times as broad as its front margin, which is transverse and a little convex at the middle. Sars mentioned the eyes and figured them as black spots, but while these spots frequently are distinct in specimens preserved during some years in spirit, I was unable to find them in specimens from several of the deeper "Ingolf" stations. Furthermore, internal visual elements of an ocellus or some two to three ocelli seem sometimes but not always to be distinguishable, but I have been unable to detect any cornea, so that the eyes must be considered quite rudimentary.

The female is well distinguished from the other species by a combination of characters, among which the most important may be enumerated. Third antennular joint is only slightly longer than the second; the chela is from two and a half to three times as long as broad, not forcipate; the legs are robust, the spurs of third to seventh pairs very broad and short or very short; the pleopods are wanting, and the uropods are short, with the two-jointed exopod not quite as long as the proximal joint of the rather stout endopod. — The length 1.55—2.05<sup>mm</sup>.

Immature Male. Agrees with the female excepting as to the abdomen, which is stronger and proportionately somewhat or considerably longer than in that sex; furthermore the pleopods are less or more developed according to age. In a younger male the pleopods are rather short with their setæ quite short. In a subadult specimen the pleopods are very well developed, conspicuously longer than the uropods, with their rami very oblong and some of the setæ longer than the rami. In the last-named specimen the third antennular joint is a little thickened below; finally fig. 5g represents the distal part of seventh leg, which agrees with that of the female in the following important particulars: the spur (on fifth joint) is very short and broad; the seventh joint, which is somewhat thick, is only one-third as long as sixth joint; the claw is thick and short.

Adult Male. Somewhat similar to the male of *P. forcipatus*, but differs in several particulars. In the relative length of the thoracic segments as compared with each other and in the strong development of abdomen it agrees with the male of *P. forcipatus* and differs consequently much from the female.

The front margin of the head (fig. 5b) between the outer angles of the antennular peduncles is considerably convex; at the outer base of each antennula the lateral part of the head (fig. 5c) is a somewhat high, flatly rounded lobe which, seen from above (fig. 5b), is very conspicuous and marked off by an oblique suture forming the continuation of the median part of the front margin; this antero-lateral small part of the head is thus above, but not on the side, marked off as an eye-lobe, but a real eye could not be discovered. — The seven-jointed antennulæ (figs. 5b and 5c) are rather similar to those of the male *P. forcipatus*, but the two proximal joints are less robust and the seventh joint not longer than the sixth.

The chelæ (fig. 5 c) are somewhat less than three times as long as broad, with the posterior margin very moderately concave, shaped in the main as in the female, but the fingers are conspicuously shorter in proportion to the hand; the movable finger is thicker and the fixed finger near the base less thick than in the male *P. forcipatus*.

The thoracic legs as in the male *P. forcipatus* conspicuously more slender than in the female and as in that species showing other differences, but besides affording specific characters. Second pair (fig. 5 c) with seventh joint plus claw more than half as long again as sixth joint. Third and fourth pairs with the short spur rather slender, while seventh joint with claw is as long as sixth joint. Three posterior pairs of legs (figs. 5 e and 5 f) with the spur short and rather slender; seventh joint with claw only a little shorter than sixth joint, and the claw itself only half as long as seventh joint.

The five anterior abdominal segments, seen from above (fig. 5 d), with the lateral margins of each segment very convex, so that the entire lateral margin of this part of the abdomen has five deep incisions, while in the male *P. forcipatus* this margin shows no such incisions. Sixth segment posteriorly somewhat produced, but much less than in *P. forcipatus*, and has at the middle of the hind margin a somewhat small, angular emargination. — The highly developed pleopods with some of the setæ more than twice as long the rami. — The uropods in the main similar to those in the female, but the rami a little longer.

Length of the single male 1.8 mm.

Occurrence. The "Ingolf" has captured this species at seven localities.

West Iceland: St. 86: Lat. 65° 03' N., Long. 23° 47.6' W., 76 fm.; 1 spec.

East of Iceland: St. 4: Lat. 64° 07' N., Long. 11° 12' W., 237 fm., temp. 2.5°; 3 spec.

- - - St. 58: Lat. 64° 25' N., Long. 12° 09' W., 211 fm., temp. 0.8°; 14 spec.

East Iceland: Seydis Fjord, 20—50 fm.; 5 spec.

North of Iceland: St. 128: Lat. 66° 30' N., Long. 20° 02' W., 194 fm., temp. 0.6°; 4 spec.

- - - St. 126: Lat. 67° 19' N., Long. 15° 52' W., 293 fm., temp. ÷ 0.5°; 5 spec.

Jan Mayen: St. 115: Lat. 70° 50' N., Long. 8° 29' W., 86 fm., temp. 0.1°; 10 spec.

*P. Liljeborgii* has besides been taken by other expeditions at six localities situated in very different parts of our area.

West Greenland: Karajok Fjord, ab. Lat. 70° 20' N.; several spec. Vanhöffen.

East Iceland: Nord Fjord, 40 fm.; 5 spec. Mag. sc. R. Horring.

East Greenland: Angmasivik, at Lat. 65° 51' N.; 1 spec. Mag. sc. Kruuse.

- — Cape Dalton, Lat. 69° 24' N., 9—11 fm.; 2 spec. (♀ and adult ♂). II<sup>d</sup> Amstrup Exp.

- — Denmark Isl., Lat. 70° 27' N., Long. 26° 12' W. 4—5 fm., muddy bottom; 1 spec. Ryder Exp.

- — — — 1 spec. Ryder Exp.

Jan Mayen: 55 fm.; 1 spec. II<sup>d</sup> Amstrup Exp.

Distribution. Outside our area hitherto known from Varanger Fjord at Vadso (ab. Lat. 70° 10' N. in East Finmark), "in a depth of 100—120 fathoms" (G. O. Sars); recently it has been taken in the Barents Sea, Lat. 76° 26' N., Long. 60° 55' E., vertical pelagic haul from 30 to 0 meters (Stappers).

*P. Liljeborgii* is thus more arctic than *P. forcipatus*; at the very cold places in the northern East Greenland it was found in quite low water, while in the open sea off Iceland it was most frequently found in depths from about 200 to near 300 fm.

17. ***Pseudotanaïs oculatus* n. sp.**

(Pl. II, figs. 6a—6d; Pl. III, figs. 1a—1d.)

Female (with the marsupium half developed, and younger specimens). Body four times as long as broad. — Carapace, seen from above (fig. 1a), with the lateral margins somewhat convex excepting near the front end, anteriorly half as broad as somewhat from the hind margin; the front margin is considerably bent, forming an angle at the middle, and the antero-lateral angle is produced, but seen from the side (fig. 1c) this produced part is not rounded but angular at the upper base of the antennæ. — The eyes are well developed, rather large, with about seven ocelli, and the cornea of each ocellus very conspicuous; in recently captured specimens the eyes are black and in a couple of specimens the dark colour has been preserved during many years.

Antennulæ about as long as the carapace plus second and half of the third thoracic segment, somewhat slender. First joint, seen from the side (fig. 1c), about four times as long as deep and with the proximal part much deeper than the middle part; this joint is somewhat longer than the two other joints combined, and third joint is somewhat longer than the second. — Antennæ somewhat robust; second and third joints proportionately long, without any real spine at the distal upper angle; third joint a little less than half as long as the fourth, which is a little less than twice as long as the penultimate joint.

Chelipeds (figs. 1b and 6a) moderately slender. Carpus somewhat less than twice as long as deep. Chela three times as long as broad (fig. 6a), with the posterior margin considerably concave; fixed finger somewhat narrow near the base, yet considerably thicker than the movable finger, slightly decreasing in breadth from near the base to somewhat beyond the middle and with most of the incisive margin straight; movable finger somewhat shorter than the anterior margin of the hand, rather narrow, towards the base not touching the other finger, and when the distal parts of the fingers are crossed, a conspicuous interval is left between their more proximal parts, but especially at the base this interval is a good deal narrower than in *P. abyssi* or *P. forcipatus*.

Fifth thoracic segment a little shorter than the three preceding segments combined and as long as the sixth. — The thoracic legs of moderate length and thickness (fig. 1b). Second pair (fig. 6b) with the sixth joint elongate, even slightly longer than fifth and fourth joints combined, much tapering towards the end and almost half as long again as seventh joint with claw. Third pair with the sixth joint about as long as the fifth plus half of the fourth and not fully twice as long as seventh joint with claw; the spur on fifth joint half as long as sixth joint, broad at the base but near the base somewhat abruptly much thinner and then tapering to the acute end. Fourth pair (fig. 6c) in the main as the third, but fifth to seventh joint somewhat shorter and the short basal part of the acute spur is very broad. Seventh pair (fig. 6d) with sixth joint slightly longer than the fifth and twice as long as seventh with claw; the spur somewhat slender.

The abdomen somewhat longer than the two posterior thoracic segments combined. Pleopods well developed, with long setæ. — Uropods (fig. 1d) with very long terminal setæ; endopod somewhat robust with the proximal joint slightly longer than the distal; exopod only a little shorter than the endopod but considerably thinner, with the proximal joint slightly shorter than the distal.

Length of a female with the marsupial lamellæ less than half developed 1.9<sup>mm</sup>.

Remarks. *P. oculatus* differs from *P. forcipatus* and *P. Liljeborgii* by possessing well developed pleopods, the exopod of the uropods much longer than the proximal joint of the endopod, etc.; it differs from *P. abyssi* in the chelæ, shorter and proportionately thicker legs, longer exopod of the uropods, etc., from *P. affinis* by features in nearly all appendages. It is on the whole more allied to *P. mediterraneus* G. O. S. than to any species described in the present paper, but differs from it in having the claw of second pair of legs shorter and in various minor features in the antennæ and thoracic legs. And above all it differs from *P. mediterraneus* and all species described from Norway or in the present paper in possessing real eyes with several well developed corneæ.

Occurrence. Taken by the "Ingolf" at a single station.

Davis Strait: St. 34: Lat. 65° 17' N., Long. 54° 17' W., 55 fm.; 1 spec.

Besides it has been captured at West and East Greenland by three other collectors.

West Greenland: Upernivik, Lat. 72° 48' N., July 21, 1887; 1 spec. Ryder.

Davis Strait: Lat. 65° 27' N., Long. 54° 45' W., 67 fm., temp. 1.1°; 1 spec. Wandel.

East Greenland: Angmagsalik, ab. Lat. 65° 30' N. Aug. 7, 1902; 1 spec. Mag. sc. Kruuse.

# 18. *Pseudotanaïs affinis* H. J. Hansen.

(Pl. III, figs. 2a—2o, and? figs. 3a—3b.)

1886. *Pseudotanaïs affinis* H. J. Hansen, *Dijmphna-Togtets zool.-bot. Udbytte*, p. 207; Tab. XXI,

Fig. 2 (Female).

— — *crassicornis* H. J. Hansen, l. c. p. 208; Tab. XXI, Fig. 3, 3a (Subadult Male).

Female. The body about five times as long as broad. — Front margin of the head only about one-third as long as the breadth of the carapace (fig. 2a), somewhat sinuate, being conspicuously convex at the middle, a little emarginate behind each antennula and with the lateral angles distinctly produced. No eyes.

The antennulæ are moderately long, somewhat more than half as long again as the carapace (fig. 2a). First joint, seen from the side (figs. 2b and 2d), with the basal fourth considerably expanded below, four and a half to five times as long as deep, at the base broader than deep and seen from above (fig. 2a) abruptly narrowed slightly beyond the middle. Second joint about three times as long as deep; third joint slender, from a little longer to one-third as long again as the second. — Antennæ moderately slender; second and third joints (fig. 2d) on the distal upper angle with a spiniform, strong process; fourth joint nearly two and a half times as long as the penultimate.

Chelipeds rather slender. Chela (fig. 2e) more slender than in the preceding species, from a little more than three times to more than three and a half times as long as broad, with the posterior margin considerably concave at the middle; the fixed finger moderately slender and tapering from

the base; the movable finger nearly as long as the front margin of the hand, conspicuously more slender than the fixed finger; when the distal parts of the fingers are crossed there is a narrow or no interval between their proximal halves.

Fifth thoracic segment about three-fourths as long as the three preceding segments combined and scarcely longer than the sixth segment. — Thoracic legs moderately long and rather slender, but the posterior pairs vary a little in this respect. Second pair (fig. 2f) with sixth joint almost as long as fifth and fourth joints combined and a little shorter than seventh joint with claw. Third pair (fig. 2g) with the sixth joint only a little longer than the fifth and not fully twice as long as seventh joint with claw; the spur on fifth joint about, or more than, half as long as sixth joint, strongly narrowed a little beyond the very broad base (fig. 2i) and with the distal half conspicuously expanded, forming a very oblong plate with the end subacute or narrowly rounded. Seventh pair (fig. 2h) with fifth joint somewhat longer than the sixth, which is not fully twice as long as seventh joint with claw; the spur not half as long as sixth joint, moderately narrow or somewhat thin, not expanded at the middle.

Abdomen almost as long as the two preceding thoracic segments combined. — Pleopods well developed; the longest setae about three times as long as their rami and on the posterior pairs even reaching the end of the uropods. — Uropods (fig. 2c) somewhat long and slender; the endopod with the proximal joint slightly longer than the distal; the exopod reaches about the middle of the distal joint of the endopod, and its proximal joint is always considerably shorter than the distal.

Length of the largest female with marsupium (from the Kara Sea)  $2.2^{mm}$ , of large specimens without marsupium  $2.1^{mm}$ .

Subadult Male. The most characteristic difference between subadult males and the other sex are the antennulae (fig. 2l), which have the first joint much thicker, the second somewhat to much thicker, than in the other sex; the third joint is slender with a thickening below at the base. Fifth and sixth thoracic segments somewhat shorter as compared with the three anterior segments than in the females. The chelae (fig. 2m) and the thoracic legs (fig. 2o) vary conspicuously as to thickness. Pleopods and uropods as in the females.

Variety. At Stat 25 the "Ingolf" captured a number of specimens, all immature and of both sexes, which in some particulars differ from the other material. The largest female is only  $1.4^{mm}$ , the largest subadult male  $1.3^{mm}$ . In the females the antennulae (fig. 2k) are distinctly less slender than usual, with first joint about four times as long as deep; the antennae are conspicuously thicker (fig. 2k) with the fourth joint only twice as long as the penultimate, while second and third joints have a slender spine instead of a stronger process on their upper distal angle. The chelae about three times as long as broad; the thoracic legs on the whole a little more robust and the spur on third pair scarcely as long as and somewhat more spiniform than in the typical form. The uropods normal. — In the subadult male the antennulae (fig. 2n) have first and second joints much thickened, but the third joint is more than half as long again as the second, the thickening is not confined to the short proximal part but reaches to near the middle of the joint, and the proximal half of the joint is distinctly conical, the distal half cylindrical. The antennae nearly as in the female, with the fourth joint slightly thicker.

The main differences between this variety and the normal form are thus the slender spines instead of processes on second and third joints of the antennæ, the shape of the proximal half of third antennular joint in the male, and the fact that the appendages of both head and thorax are on the whole more robust. But I think it improbable that these differences are of specific value; adult females with marsupium ought at least to be procured before the variety may possibly be separated as a new species.

Remarks. I established *P. affinis* on 3 females from the Kara Sea, while the insufficiency of the literature on the genus and my very scanty material induced me to establish *P. crassicornis* on a subadult male. I find it useful to insert here a more detailed description of female and subadult male together with a number of figures, as I now possess a rich material both of this species and of other forms.

*P. affinis* is closely allied to *P. macrocheles* G. O. Sars, but if the figures published by Sars (1897) are correct, the latter species differs especially in the outer ramus of the uropod, which is shorter and showing a proportion between its joints quite different from the features found in *P. affinis*; besides Sars has figured the antennulæ with a strong seta, while a process is found in the typical specimens of *P. affinis*. Sars' figures of the legs differ also in minor particulars from *P. affinis*.

Adult Male (Pl. III, figs. 3a—3b). A single adult male has been taken (at "Ingolf" St. 124) together with two females. But though this specimen considerably resembles the male of *P. forcipatus*, I am not quite sure that it belongs to *P. affinis*. The head, seen from the side (fig. 3a), has the antero-lateral lobe still longer than in *P. forcipatus*, broadly rounded. — The antennulæ have the fifth joint slightly shorter than the sixth, which is scarcely as long as the seventh. — The antennæ thicker than in the female; third joint proportionately long, as long as the penultimate joint, with a rather long spine on the distal upper angle. — The chelæ shaped as in the male *P. forcipatus*, somewhat more than twice as long as broad; the fixed finger at the base more than twice as broad as the movable, which is somewhat shorter than the front margin of the hand; a narrow interval is seen between the subdistal portions of the fingers.

Second pair of legs (fig. 3a) with the sixth joint a little shorter than the two preceding joints combined, but as long as seventh joint with claw. Fourth pair of legs uncommonly short, only two-thirds as long as the sixth pair; fifth pair, which are poorly preserved, seem also to be somewhat short. The three posterior pairs have the sixth joint a little shorter than seventh joint with claw.

The abdomen as to the shape of the lateral margins (fig. 3b) and other particulars nearly as in *P. forcipatus*, but sixth segment is proportionately longer and more produced backwards, reaching slightly beyond the end of first joint of the endopod of the uropods, while the posterior margin is somewhat broad and deeply emarginate as in *P. forcipatus*. — The uropods differ much from those of the female; the endopod has the proximal joint much longer than the distal, the exopod reaches slightly beyond the proximal joint of the endopod and its first joint is somewhat longer than the second.

Length of the single male 1.36 mm.

The shape of the chelæ and especially the relative length of the joints in the uropods as compared with the corresponding organs of the female *P. affinis* make the reference of the adult male to

this species somewhat uncertain, though, on the other hand, the antennulæ, the chelæ, the second pair of legs and the shape of the last abdominal segment show close relationship to the above-described males of the two other species of this genus, and no other species of the genus is known to which the male might possibly belong. For these reasons I have described and figured this male and referred it, with a query, to *P. affinis*.

Occurrence. The "Ingolf" has captured this species at twelve stations.

Davis Strait:	St. 32: Lat. 66° 35' N., Long. 56° 38' W., 318 fm., temp. 3.9°; 3 spec.
—	St. 25: Lat. 63° 30' N., Long. 54° 25' W., 582 fm., temp. 3.3°; 13 spec., described above as a variety.
—	St. 24: Lat. 63° 06' N., Long. 56° 00' W., 1199 fm., temp. 2.4°; 3 spec.
South-West of Iceland:	St. 78: Lat. 60° 37' N., Long. 27° 52' W., 799 fm., temp. 4.5°; 1 spec.
North-West of the Færoes:	St. 138: Lat. 63° 26' N., Long. 7° 56' W., 471 fm., temp. ÷ 0.6°; 4 spec.
— - - —	St. 139: Lat. 63° 36' N., Long. 7° 30' W., 702 fm., temp. ÷ 0.6°; 1 spec.
East of Iceland:	St. 103: Lat. 66° 23' N., Long. 8° 52' W., 579 fm., temp. ÷ 0.6°; 3 spec.
— - —	St. 102: Lat. 66° 23' N., Long. 10° 26' W., 750 fm., temp. ÷ 0.9°; 1 spec.
— - —	St. 101: Lat. 66° 23' N., Long. 12° 05' W., 537 fm., temp. ÷ 0.7°; 3 spec.
North of Iceland:	St. 124: Lat. 67° 40' N., Long. 15° 40' W., 495 fm., temp. ÷ 0.6°; 3 spec.
North-East of Iceland:	St. 119: Lat. 67° 53' N., Long. 10° 19' W., 1010 fm., temp. ÷ 1.0°; 6 spec.
South of Jan Mayen:	St. 116: Lat. 70° 05' N., Long. 8° 26' W., 371 fm., temp. ÷ 0.4°; 1 spec.
Besides the species has been secured by the II <sup>d</sup> Andrup Exped. at a single locality.	
East Greenland: Forsblad Fjord, at Lat. 72° 27' N., Long. 25° 28' W., 50—90 fm.; 1 spec.	

Distribution. The type specimens were taken in the Kara Sea, 64—65 fm. (H. J. Hansen).

— According to the list of localities the species has been taken four times in the warm area in depths from 318 to near 1200 fm., and the highest temperature is 4.5°, but besides it is widely distributed in the cold area in depths from 371 to 1010 fm. and the lowest temperature was ÷ 1.0°; finally it has been captured at cold localities in the northern East Greenland and the Kara Sea in much lesser depths, viz. between 50 and 90 fm.

#### 19. *Pseudotanaïs longipes* n. sp.

(Pl. III, figs. 4a—4i.)

Female. The body scarcely four times as long as broad. — Carapace strongly tapering in breadth forwards (fig. 4b), with the lateral margins not much convex; the anterior margin, which is even a little less than one-third as long as the breadth of the carapace somewhat before its hind margin, is feebly concave at each antennula. — Eyes wanting.

Antennulæ very elongate, twice as long as the carapace (fig. 4a) and extremely slender (fig. 4c). First joint more than six times as long as deep though its proximal part is somewhat thickened below, slightly longer than the two other joints combined; second joint not half as long as the third; the setæ on all joints extremely long. — The antennæ (fig. 4c) are very slender; third joint shorter

than deep and much shorter than the second; fourth joint extremely long, almost four times as long as the penultimate joint, which is conspicuously longer than second and third joints combined.

Chelipeds somewhat long and slender (fig. 4a). Carpus twice as long as the basal joint and three times as long as deep. Chela a little less than half as long again as the carpus, four and a half times as long as broad (fig. 4d); the fixed finger at the base somewhat broader than the movable and keeping almost the same breadth to beyond the middle; the movable finger slender, tapering from near the base to the end, and the fingers without any interval between them when their terminal parts cross each other.

Fifth thoracic segment slightly longer than the three preceding segments combined, or than the sixth segment. — The legs extremely long and very slender; second pair with the sixth joint, though very long, scarcely as long as the sum of the two preceding joints but somewhat longer than seventh joint with claw, and the claw almost twice as long as seventh joint. Third pair (fig. 4f) with the sixth joint slightly shorter than the fifth and slightly longer than seventh joint with claw; the spur on fifth joint is a very long, slender spine. Fourth pair in the main as the third pair; the spur on fifth joint is a slender spine more than two-thirds as long as the sixth joint (fig. 4g) which is considerably longer than seventh joint with claw. — Seventh pair (fig. 4h) with the sixth joint slightly longer than the fifth and about two and a half times as long as seventh joint with claw.

Abdomen slightly longer than seventh, sixth and half of the fifth thoracic segment combined. Pleopods with slender rami and long setae. — Uropods long and very slender (fig. 4i); the endopod with the proximal joint somewhat longer than the distal; the exopod reaches a little beyond the middle of the distal joint of the endopod, but its division into two joints could not be perceived with certainty; one of the terminal setae of the exopod is nearly three times as long as the ramus itself and a little longer than the longest terminal seta of the endopod.

Length of the immature female drawn (the marsupial lamellae are small) 1.60<sup>mm</sup>; another female without marsupium measures 1.95<sup>mm</sup>.

Remarks. *P. longipes* is easily distinguished from all other species of the genus by its extremely long and slender antennulae, legs and uropods and the long and narrow chelae.

It was taken at the station, where the trawl was filled with an enormous quantity of sponges, and it is of interest to note, that *Typhlotanais eximius* n. sp., which possesses chelae more narrow and longer than any other species of the genus, and besides a most curious, extremely long-legged species of the sub-order Asellola have been taken at the same station. Judging from these facts I am inclined to suppose that such long-legged species have been developed under the influence of the environment, the sponges, and have been adapted to live on that peculiar ground.

Occurrence. This species has been taken by the "Ingolf" at a single station.

South-West of Iceland: St. 78: Lat. 60° 37' N., Long. 27° 52' W., 799 fm., temp. 4.5°; 3 spec.

### Paratanais Dana.

This genus comprises at present nine species, but only a single form is known from the area investigated.



20. **Paratanais Batei** G. O. Sars.

1884. *Paratanais Batei* G. O. Sars, Arch. for Math. og Naturv. B. 7, p. 32.

! 1896. — — — Account Crust. Norw. Vol. II, p. 16, Pl. VII.

Occurrence. This well-known species has not been taken by the "Ingolf", but by two travelling Zoologists.

South of Iceland: Vestmannaeyjar, the littoral belt, Aug. 21, 1899; 1 spec. Mag. B. Sæmundsen.

The Færoes: Vestmanhavn, 10—30 fm., June 2, 1899; 1 spec. Dr. Th. Mortensen.

Distribution. *P. Batei* has been taken "in several places on the west coast of Norway, in comparatively shallow water among the roots of *Laminariæ*" (G. O. Sars). Furthermore it is known from some places on both sides of Scotland (T. Scott), from Falmouth and Plymouth (A. M. Norman), Galway Bay in Ireland, 5—15 fm. (Tattersall), the Channel Islands (various authors), Saint-Jan-de-Luz in S. W. France, 2½ fm. (Dollfus), finally from the Mediterranean at Spezia, 6—10 fm. (G. O. Sars) and the Gulf of Naples, 1—1½ fm. (G. Smith).

*P. Batei* is decidedly a shallow water species, and its occurrence near South Iceland is of interest, as some other Crustacea from the Lusitanian area also occur there and have their limit of distribution in north-western direction at that coast.

### **Typhlotanais** G. O. Sars.

This genus hitherto comprised sixteen species, of which nine are known from Norway. The "Ingolf" material comprises nineteen species, but sixteen of these are new, while three are dealt with in the work of Sars. The sixteen new species were all taken in depths ranging from 293 to 1870 fathoms, and the majority exclusively in depths from 690 to 1870 fathoms, but even eleven of these species were captured only at a single station and seven among them I establish on a single specimen. Judging from these facts I am tolerably sure that several and probably numerous species of this genus living in the area explored by the "Ingolf" are still undiscovered, furthermore that the depths of the oceans, from about 400 to at least 2000 fathoms, must contain a very large number of species of this genus.

Sars has published a good description of the genus according to the species seen by him. But some of my new species differ conspicuously from that description in a few points. Thus, some species have the lateral margins of the thoracic segments very angular, while Sars said that the lateral contours of the body are almost straight; *T. macrocephala* has the cephalothorax extremely large, the antennulæ much thicker and the chelæ broader than allowable according to Sars' diagnosis. But I have found it impossible not only to separate a single form or some species as a new genus, but even to divide my nineteen species into moderately well separated groups, because the characters are intermingled in such a way and so gradually developed in various species, that no natural division of any value could be discovered.

The scantiness of my material of the majority of the new species rendered it impossible to examine their mouth-parts. But I have examined these parts of one of the species most aberrant from the forms studied by Sars, viz. *T. irregularis* n. sp., and found that they differed so little from

the figures published by Sars that the only feature worth mentioning is, that the movable lobe on the left mandible is very large, being a little longer and probably broader than the incisive lobe. Consequently, I suppose that Sars' description and figures in all points of any importance hold good for all species described in the following pages.

The genus *Typhlotanais* (females and immature males) may be characterized by the following diagnosis. Eyes wanting. Antennulæ three-jointed; first joint at least as long as and generally longer than the two other joints combined, second joint proportionately short. Antennæ with fourth and fifth joints completely fused, without any suture between them. Mandibles well developed with their molar process cylindrical or even a little thicker at the obliquely cut, dentate end. Chelæ slender, at least two and a half times as long as broad. Second pair of legs differ conspicuously from third or fourth pair by having seventh joint with claw considerably longer. Pleopods well developed in the female. Uropods with the rami slender, two-jointed or one-jointed. Incubatory pouch consists of four pairs of lamellæ. — (Adult males of all species unknown excepting of *T. finmarchicus* G. O. S., which has been described by Sars).

21. *Typhlotanais irregularis* n. sp.

(Pl. III, figs. 5a—5e.)

Female. Body moderately robust, somewhat more than five times as long as broad. — Carapace somewhat or considerably shorter than the two next segments combined, a little longer than broad, with the lateral margins somewhat convex, the front margin two-thirds as long as the posterior and the median process moderately long, acute.

Antennulæ (figs. 5a and 5b) considerably shorter than the carapace, rather stout. First joint considerably longer than the two other joints combined, not fully two and a half times as long as deep and tapering considerably and gradually from a little from the base to the end; second joint scarcely as deep as long and about half as long as the third; the longest terminal seta scarcely as long as third and second joints combined. — Antennæ moderately robust; third joint not thickened; fourth considerably less than twice as long as the penultimate joint; terminal setæ scarcely as long as those of the antennulæ.

Chelipeds (fig. 5b) moderately strong. Basal joint with the proximal protuberance somewhat short; the distance between its posterior end and the front lower angle of second thoracic segment about as long as the basal joint. Carpus distinctly longer than the basal joint and almost twice as long as deep. Chela (fig. 5c) distinctly longer than the carpus, about three times as long as broad; movable finger somewhat longer than the front margin of the hand; both fingers very acute; fixed finger near the base considerably broader than the movable and with an acute tooth somewhat from the end of the incisive margin.

Thoracic segments (fig. 5a) peculiarly shaped, decreasing in breadth from second to seventh, the latter being only slightly more than half as broad as the second; furthermore the segments increase a little in length from the second to the fourth and then decrease to the seventh. Second segment decreases very conspicuously in breadth from the antero-lateral, protruding angles to the pos-

terior margin; it is unusually large, slightly more than half as long as the carapace, somewhat or a little less than twice as broad as long, a little or somewhat shorter than third segment and without any process below. Third to seventh segments with their lateral margins strongly angular or, in the three posterior segments, very convex, but the angles or the broadest place of the segment is on the third segment situated not much behind the front margin, on the fourth a little more backwards, on the fifth at the middle, on the sixth somewhat behind the middle and on the seventh a little before the posterior margin. — The legs are rather long and slender; second pair have the sixth joint (fig. 5b) almost as long as fifth and fourth joints combined and only a little longer than seventh joint with claw; the few setæ of the legs short. Third pair rather similar to second, but sixth joint is a little shorter and seventh joint with claw only about two-thirds as long as sixth joint; setæ short. Fourth pair completely as the third. Seventh pair (fig. 5d) slender; second joint almost five times as long as broad; fourth and fifth joints not expanded, with a tooth-shaped spine at the distal posterior angle; sixth joint somewhat longer than the fifth; seventh joint with claw more than half as long as sixth joint.

Abdomen scarcely as long as the two preceding segments combined. — Uropods long and slender (figs. 5a and 5e); endopod two-jointed, with first joint somewhat or a little less than twice as long as the second; the exopod reaches the middle of the distal joint of the endopod and seems to be undivided.

Length of a female with marsupium 1.6<sup>mm</sup>, of a large female without marsupium 1.85<sup>mm</sup>.

Subadult Male. Differs from the female only in the antennulæ, which have the distal part of first joint and the whole second joint somewhat thicker than in the female, while the third joint has the basal part distinctly thickened on the lower side.

Remarks. *T. irregularis* is easily distinguished from all other forms of the genus excepting *T. macrocephala* n. sp. and *T. mucronatus* n. sp. by the shape and relative length and breadth of the thoracic segments; the rather short antennulæ, the legs and the uropods afford further characters. It bears some resemblance to *T. macrocephala*, but the latter species is easily distinguished by its extremely large carapace, the enormous process on the lower side of second thoracic segment, etc. From *T. mucronatus* it is easily separated by the widely different antennæ, short setæ on the legs, etc.

Occurrence. The "Ingolf" has taken this fine species at twelve stations, all in the cold area.

North of the Færoes:	St. 141: Lat. 63° 22' N., Long. 6° 58' W., 679 fm., temp. ÷ 0.6°; 22 spec.
— - - —	St. 139: Lat. 63° 36' N., Long. 7° 30' W., 702 fm., temp. ÷ 0.6°; ab. 50 spec.
East of Iceland:	St. 104: Lat. 66° 23' N., Long. 7° 25' W., 957 fm., temp. ÷ 1.1°; 1 spec.
— - —	St. 103: Lat. 66° 23' N., Long. 8° 52' W., 579 fm., temp. ÷ 0.6°; 1 spec.
— - —	St. 102: Lat. 66° 23' N., Long. 10° 26' W., 750 fm., temp. ÷ 0.9°; 21 spec.
North of Iceland:	St. 126: Lat. 67° 19' N., Long. 15° 52' W., 293 fm., temp. ÷ 0.5°; 2 spec.
— - —	St. 125: Lat. 68° 08' N., Long. 16° 02' W., 729 fm., temp. ÷ 0.8°; 12 spec.
North-East of Iceland:	St. 120: Lat. 67° 29' N., Long. 11° 32' W., 885 fm., temp. ÷ 1.0°; 2 spec.
— - —	St. 119: Lat. 67° 53' N., Long. 10° 19' W., 1010 fm., temp. ÷ 1.0°; 2 spec.
South of Jan Mayen:	St. 118: Lat. 68° 27' N., Long. 8° 20' W., 1060 fm., temp. ÷ 1.0°; 6 spec.
— - - —	St. 117: Lat. 69° 13' N., Long. 8° 23' W., 1003 fm., temp. ÷ 1.0°; ab. 40 spec.

South of Jan Mayen: St. 113: Lat.  $69^{\circ}31'N$ , Long.  $7^{\circ}06'W$ , 1309 fm., temp.  $\div 1.0^{\circ}$ ; 7 spec.

Distribution. A single ovigerous female has been found between some material from the Kara Sea brought home by the "Dijmphna" Expedition.

22. *Typhlotanais macrocephala* n. sp.

(Pl. III, figs. 6a—6e.)

Specimen without marsupium. Body almost five and a half times as long as broad. — Carapace (fig. 6a) exceedingly large, nearly longer than second, third and half of fourth segment combined, considerably longer than broad; the anterior margin only a little shorter than the posterior, with the frontal process constituting a broad, rather low triangle with the margins along the base of the antennulæ very feebly concave; the carapace is broadest at the end of the anterior two-thirds, and the major part of its lateral margins are somewhat convex and posteriorly with a few saw-teeth or fine indentations.

The antennulæ (fig. 6b) are short and thick, conical, only half as long as the carapace. First joint about half as long again as deep; the two distal joints combined about as long as the depth of the first joint; second joint much deeper than long; third joint proportionately thick at the base, conical, with the terminal setæ about as long as the first joint. — Antennæ short and moderately thick; third joint not thickened, fourth considerably less than twice as long as the penultimate joint; terminal setæ nearly as long as those of the antennulæ.

Chelipeds somewhat small (fig. 6b). Posterior protuberance on the basal joint short; the distance between its hind margin and the anterior lower angle and second thoracic segment considerably longer than the basal joint. Carpus considerably longer than the basal joint, about twice as long as deep. Chela a little longer than the carpus, only about two and a half times as long as broad; movable finger distinctly longer than the front margin of the hand; fixed finger thick at the base, with a tooth before the end.

Thoracic segments (fig. 6a) somewhat similar in general shape and relative dimensions to those of *T. irregularis*, but the major posterior part of the lateral margins of second to fourth segment with four or five distinct teeth (fig. 6c). Second segment slightly narrower than the carapace, not fully twice as broad as long, broadest at the angle a little behind the anterior margin and decreasing much in breadth posteriorly; seen from the side (fig. 6b) this segment is expanded downwards below and the expansion produced in an enormous process, the base of which is as long as the segment, while the posterior margin is regularly convex, the anterior margin deeply concave and the end of the process acute and directed somewhat forwards. Third segment scarcely longer and considerably narrower than the second but otherwise nearly of the same shape (fig. 6a); fourth segment about as long as the third but distinctly narrower and of similar shape. Fifth and sixth segments each scarcely as broad as the fourth and only a little more than half as broad as the carapace, while seventh segment is as broad as the fourth; the lateral margins of all three segments are considerably convex and more or less distinctly angular; fifth segment broadest a little behind the middle and the two other segments broadest somewhat behind the middle; the fifth segment has a few nearly rudimentary teeth

on the posterior part of the lateral margins. — Thoracic legs moderately long and rather slender; second pair (fig. 6b) with sixth joint only a little shorter than fifth and fourth joints combined and slightly longer than seventh joint with claw; setæ short. Third pair with sixth joint as long as the fifth plus half of the fourth; seventh joint with claw as long as fifth joint; setæ short. Seventh pair (fig. 6d) moderately long; second joint slender, nearly five times as long as broad; fourth and fifth joints moderately broad but scarcely expanded and without any armature; sixth joint proportionately somewhat stout, being not much thinner than the fifth and about as long as the fifth plus half of the fourth; seventh joint with claw quite short.

Abdomen as broad as the last thoracic segment, with the sides somewhat convex, a little shorter than the two preceding segments combined. — Uropods of moderate length (fig. 6e); endopod two-jointed with the proximal joint somewhat longer than the distal; exopod a little shorter than the endopod, two-jointed, with the proximal joint a little shorter than the distal.

Length of the single specimen (probably a female) 1.20 mm.

Remarks. This species differs from all other forms of the genus by its gigantic carapace, the very short and thick antennulæ, the huge process on the lower side of second thoracic segment and the serrate lateral margins of the three (four) anterior thoracic segments. In some other features and especially in the dorsal aspect of the thoracic segments it resembles considerably *T. irregularis* n. sp.

Occurrence. The single specimen has been captured by the "Ingolf".

South-West of Iceland: St. 78: Lat. 60°37' N., Long. 27°52' W., 799 fm., temp. 4.5°; 1 spec.

### 23. *Typhlotanais pulcher* n. sp.

(Pl. IV, figs. 1a—1g.)

Specimen without marsupium. Body very slender, more than eight times as long as broad. — Carapace considerably longer than broad but only slightly longer than the unusually long second thoracic segment (figs. 1a and 1b), lateral margins rounded posteriorly and from there converging gradually forwards to the anterior margin, which is somewhat longer than half of the breadth of the carapace, and the rostral process is somewhat long, subacute.

Antennulæ (figs. 1b and 1c) nearly as long as the carapace, moderately slender. First joint somewhat longer than the two other joints combined, about three and a half times as long as deep, and, seen from the side, not tapering, which renders it probable that the specimen may be an immature male; second joint about as long as deep, not half as long as the third joint, which has its proximal part slightly thickened on the lower side; terminal setæ as long as the two distal joints combined. — Antennæ moderately slender; third joint not thickened; fourth joint a little more than twice as long as the penultimate, and both these joints with long setæ at the end, while the setæ of the terminal joint are still longer, though a little shorter than the longest terminal antennular setæ.

Chelipeds (fig. 1c) moderately slender. Basal joint with the proximal protuberance scarcely free and of moderate length; its posterior end far removed from the front lower end of second thoracic segment. Carpus a little less than three times as long as deep. Chela a little longer than the carpus, three times as long as broad; movable finger rather slender and much longer than the front margin

or the hand; fixed finger towards the base much broader than the movable and with about three sharp teeth along the distal part of the incisive margin.

Thoracic segments extremely characteristic (fig. 1a). Second segment almost as long as the carapace or third segment and slightly longer than the fourth; each lateral margin is a straight line and the lateral margins converge considerably from the anterior to the posterior end; no ventral process is found. Third segment similar to the second excepting that it is broadest somewhat behind the anterior margin and the somewhat short anterior part of the lateral margin between its front end and the lateral angle is even concave. Fourth segment shaped nearly as the third. Fifth segment even slightly shorter and somewhat narrower than the fourth, with the major part of the lateral margins subparallel and the margins rounded and converging towards both ends. Sixth segment considerably shorter than the fifth and almost twice as long as the seventh, and both these segments increase somewhat in breadth from the anterior end to respectively somewhat from or near to the posterior margin. — Thoracic legs very different from each other. Second pair (fig. 1c) long and slender; fifth joint at the anterior distal angle with a seta as long as the joint; sixth joint considerably longer than the fifth and somewhat shorter than seventh joint with claw. Third pair (fig. 1d) considerably shorter than second, very slender; sixth joint conspicuously shorter than the fifth, nearly twice as long as seventh joint and with its anterior distal setæ somewhat long. Three posterior pairs (figs. 1e and 1f) moderately slender; second joint nearly four times as long as broad; fifth joint with the distal half somewhat expanded; sixth joint moderately long and somewhat slender, a little more than half as long again as seventh joint with claw.

Abdomen slightly longer than the two preceding segments combined (fig. 1a), somewhat oval, posteriorly nearly truncate with a low, rounded median protuberance. — Uropods (fig. 1g) short; endopod two-jointed with first joint somewhat longer than the second; exopod one-jointed, slightly longer than the proximal joint of the endopod.

Length of the specimen, which according to the antennulæ seems to be an immature male, 2.7<sup>mm</sup>.

Remarks. This species, taken in very great depth, differs strongly from all other species of the genus by the shape and especially the relative length of the thoracic segments, the differences being in reality so great that one is tempted to regard them as being of generic value, but antennulæ, antennæ, chelipeds, thoracic legs, pleopods and uropods agree with structural features frequently found in *Typhlotanais*. The long seta at the end of fifth joint of second pair of legs is certainly a good specific character.

Occurrence. The single specimen has been taken by the "Ingolf".

South of the Davis Strait: St. 38: Lat. 59° 12' N., Long. 51° 05' W., 1870 fm., temp. 1.3°; 1 spec.

#### 24. *Typhlotanais gracilipes* n. sp.

(Pl. IV, figs. 2a—2e.)

Female (without marsupium). Body very slender, almost eight times as long as broad. — Carapace (figs. 2a and 2b) long and narrow, as long as second, third and the half of fourth segment

combined, more than half as long again as broad; the lateral margins feebly convex posteriorly and then converging to the front angles; the anterior end slightly more than half as broad as the carapace a little from the hind margin; rostral process moderately long, somewhat narrow, acute.

Antennulæ (figs. 2a and 2b) considerably shorter than the carapace, somewhat robust. First joint a good deal longer than second and third joints combined, not fully three times as long as deep and tapering considerably to the end; second joint about as long as deep; third joint conspicuously more than twice as long as the second, thin, with the longest terminal seta scarcely longer than the joint. — Antennæ of usual size; third joint not thickened; fourth joint not twice as long as the penultimate and with long setæ from its distal lower angle; longest terminal setæ much longer than those of the antennulæ.

Chelipeds very slender (fig. 2b). Basal joint with the posterior process moderately long and its proximal margin rounded; the distance between this margin and the front lower end of second segment only a little shorter than the basal joint. Carpus almost twice as long as the basal joint and a little more than three times as long as deep. Chela small, somewhat shorter than the carpus, three and a half times as long as broad; movable finger slightly longer than the anterior margin of the hand; fixed finger near the base considerably broader than the movable.

Thoracic segments, as far as could be ascertained in the mutilated specimen, in the main as in *T. mucronatus* n. sp. (comp. description and figs. 3a of this species), but the difference between the anterior and the posterior breadth of each segment seems to be a little smaller and the lateral margins of the segments a little less convex (fig. 2a). Second segment (figs. 2a and 2b) only slightly more than half as long as the third and without ventral process. — Thoracic legs on the whole slender. Second pair (fig. 2b) slender and moderately long; fourth and fifth joints with the distal anterior setæ somewhat long; sixth joint long, only a little shorter than fifth and fourth joints combined and without any perceptible distal anterior seta; seventh joint with claw nearly as long as sixth joint. Third pair mutilated, but scarcely much different from fourth pair (fig. 2c) which is very slender, much shorter than second pair, with a rather long seta on the distal anterior angle of fifth joint, sixth joint considerably longer than the fifth but slightly longer than seventh joint with claw. Three posterior pairs of legs peculiarly built and unusually long (fig. 2d); second joint not fully four times as long as broad; fourth and fifth joints somewhat slender, though considerably and gradually widened on the anterior side towards the end, and there with a couple of somewhat long, slender spines, fifth joint besides with a couple of slender spines on the terminal inner margin; sixth joint not much longer than the fifth, moderately slender; seventh joint and the short, thin claw combined somewhat more than half as long as sixth joint.

Abdomen about as long as the two preceding segments combined. — Uropods mutilated, but one exopod (fig. 2e) has been preserved; it is long, very slender, perhaps undivided, but the seta generally found just before the articulation is long and originates even slightly beyond the middle.

Length of the single specimen 2.05 mm.

Remarks. *T. gracilipes* is easily distinguished from all species of *Typhlotanaïs* described in this paper by its slender, small chelipeds and the peculiar three posterior pairs of thoracic legs with the long and slender spines on fourth and fifth joints. It is closely allied to *T. microcheles* G. O. S.,

but according to Sars' figures and my examination of some of his co-types it differs in some particulars. In *T. microcheles* the chelipeds have the basal joint about three-fourths as long as the carpus, thus considerably longer than in *T. gracilipes*, and their carpus is deeper, scarcely two and a half times as long as deep; furthermore the thoracic legs are on the whole a little more robust than in *T. gracilipes*. In a specimen of *T. microcheles* with the ventral side of the anterior thoracic segments flat and without marsupium no ventral process on second segment is found, but in three other specimens presented by Sars the ventral surface of the anterior segments is convex, the second segment has a very large, long and broad, oblique-triangular, acute ventral process directed forwards and downwards, and each of the four following segments has a somewhat smaller but yet far from small, acute, somewhat curved ventral process.

Occurrence. The single specimen was taken by the "Ingolf".

South of Iceland: St. 54: Lat.  $63^{\circ}08' N.$ , Long.  $15^{\circ}40' W.$ , 691 fm., temp.  $3.9^{\circ}$ ; 1 spec.

25. ***Typhlotanais mucronatus* n. sp.**

(Pl. IV, figs. 3a—3h.)

Female (without marsupium). Body slender, about six and a half times as long as broad. — Carapace (fig. 3b) somewhat small, slightly broader than long, a little longer or somewhat shorter than second segment plus half of the third; the lateral margins are somewhat convex, the anterior margin is even a little more than two-thirds as long as the breadth of the carapace and the frontal process very broad, proportionately rather low and broadly rounded.

Antennulæ (figs. 3b and 3c) extremely long and slender, a little longer than carapace and second thoracic segment combined. First joint a little longer than the two other joints together, very slender excepting its proximal fourth, which is considerably thickened below and its depth is here about one-fifth of the length of the joint; seen from above (fig. 3b) the joint is rather broad at the base, tapers considerably to beyond the middle, where it is abruptly narrowed a little and its distal part is subcylindrical. Second joint is thin, almost three times as long as deep; third joint very thin, more than twice as long as the second, with the longest terminal setæ extremely long, longer than the two distal joints and half of the proximal joint combined. — Antennæ slender but somewhat short as compared with the antennulæ (fig. 3c); third joint feebly thickened; fourth joint about twice as long as the penultimate; terminal setæ long, yet conspicuously less than half as long as those of the antennulæ.

Chelipeds slender (fig. 3c). Posterior process on the basal joint moderately short; the distance between its hind margin and the front lower end of second thoracic segment about half as long as the basal joint. Carpus considerably longer than the basal joint, almost three times as long as deep. Chela (fig. 3d) slightly longer than the carpus, almost four times as long as broad; movable finger nearly half as long again as the front margin of the hand; fixed finger much broader than the movable with a few low, obtuse teeth towards the end of the incisive margin.

Thoracic segments somewhat reminding of those of *T. irregularis*, increasing in length and decreasing in breadth from second to fifth, decreasing in length and increasing in breadth from fifth



to seventh segment (fig. 3a). Second segment about twice as broad as long, with the lateral margins distinctly convex and besides converging from somewhat behind the anterior to the posterior end; the segment is below and a little behind the front end produced in a very strong, oblique-triangular, acute process directed downwards and much forwards (fig. 3c). Third segment about half as long again as the second, broadest not much behind the anterior margin, but the lateral angles somewhat rounded, and from these angles the margins converge considerably to the hind margin; fourth segment nearly as the third, but the rounded lateral angles are nearer to the middle of the segment; fifth segment as long as broad, with the lateral margins nearly regularly convex. The two posterior segments increase almost gradually in breadth to somewhat behind the middle and the posterior part of their lateral margins is convex, thus converging near the hind margin, which is longer than the front margin of the same segment. — Thoracic legs slender. Second pair long (fig. 3c); fourth joint with a long seta from the anterior distal angle; fifth joint with two long setae from the corresponding angle; sixth joint only somewhat longer than the fifth, with the setae somewhat short; seventh joint with claw scarcely as long as fifth joint. Third pair somewhat shorter than the second; fifth joint with a long seta from the anterior distal angle; sixth joint as long as the fifth plus half of the fourth, with its distal anterior seta extremely long; seventh joint with claw less than half as long as sixth joint. Fourth pair in the main as the third. Three posterior pairs subsimilar, moderately long, slender (fig. 3e); second joint more than four times as long as broad; fourth joint not expanded, without spines, fifth joint (fig. 3f) with a small spine on the outer side of the end, while the joint is distally on the anterior side produced into a peculiar, short, broad, subtriangular, acute process directed forwards; sixth joint moderately strong, scarcely widened towards the end, a little longer than fifth joint and with a small spine on the anterior side a little before the end; seventh joint with claw distinctly less than half as long as sixth joint.

Abdomen a little longer than the two posterior thoracic segments combined and as broad as the second segment. — Uropods moderately short (fig. 3g); endopod two-jointed, with first joint conspicuously longer than the second; exopod scarcely reaching the middle of second joint of the endopod, without any perceptible division into two joints.

Length 2.45<sup>mm</sup>.

Subadult Male. It differs from the female in having the antennulæ (fig. 3h) much thicker; first joint is not four times as long as deep and with nearly the same depth from base to end; the two other joints combined as long as first joint; second joint is proportionately thick, though somewhat longer than deep; third joint is conspicuously thicker than in the female and with the proximal third a little thickened below.

Remarks. *T. mucronatus* is especially distinguished by the long antennulæ with the third joint very long and in the female extremely thin, by the large ventral process on second thoracic segment, by the long setae on some joints of the anterior pairs of thoracic legs, and by the peculiar process on fifth joint of the posterior pairs; furthermore the thoracic segments, seen from above, differ markedly from most other species.

Occurrence. It was taken by the "Ingolf" at three stations in the cold area and in very considerable depths.

North-East of Iceland: St. 120: Lat.  $67^{\circ}29'N$ , Long.  $11^{\circ}32'W$ , 885 fm., temp.  $\div 1.0^{\circ}$ ; 10 spec.

— — — St. 119: Lat.  $67^{\circ}53'N$ , Long.  $10^{\circ}19'W$ , 1010 fm., temp.  $\div 1.0^{\circ}$ ; 1 spec.

South of Jan Mayen: St. 117: Lat.  $69^{\circ}13'N$ , Long.  $8^{\circ}23'W$ , 1003 fm., temp.  $\div 1.0$ ; 1 spec.

26. ***Typhlotanais eximius*** n. sp.

(Pl. IV, figs. 4a—4g.)

Female (without marsupium). The body of a somewhat contracted, not fullgrown specimen (fig. 4a) robust, somewhat less than four times as long as broad. — Carapace in the first-named specimen as long as the three following segments combined, in the second specimen (fig. 4b) somewhat longer than the two anterior segments combined; it is a little broader than long, the lateral margins posteriorly convex and then converging nearly evenly forwards to the anterior, somewhat produced angle; the front margin nearly half as long as the breadth of the carapace and the rostral process moderately large, acute.

Antennulæ long, as long as the carapace, second segment and half or almost the whole third segment combined. First joint (fig. 4b) considerably longer than the two other joints combined, about four and a half times as long as deep, and, seen from the side or from above, tapering considerably from somewhat from the base to the end. Second joint distinctly more than half as long as the third, not three times as long as deep; longest terminal seta almost as long as first and second joints combined. — Antennæ somewhat long; third joint somewhat thickened; fourth joint twice as long as the penultimate; terminal setæ very long, though somewhat shorter than those of the antennulæ.

Chelipeds (fig. 4b) long and very slender, excepting the basal joint which is somewhat thick, with the posterior protuberance thick, short, broadly rounded behind and reaching to near the front lower angle of second thoracic segment. Carpus more than half as long again as the basal joint, four times as long as deep and somewhat curved, with the lower margin conspicuously concave. Chela as long as the carpus and nearly more than six times as long as broad, with the hand very elongate, only somewhat less than twice as long as the movable finger, which is slightly thinner than the fixed finger.

Thoracic segments short in proportion to their breadth; the three anterior segments together as long as fifth and sixth segments combined; the second segment is about half as long as the third and the fourth is somewhat longer than the fifth, which is slightly longer than the sixth. The lateral margins of third and fourth segments feebly convex before the middle, of the three posterior segments a little convex or subangular rather near their posterior end. Second segment below with a moderately small, curved, acute process projecting near the front end, directed downwards and much forwards. — Thoracic legs slender. Second pair (fig. 4b) long; fifth joint with the distal anterior seta moderately short, sixth joint somewhat longer than the fifth and considerably longer than seventh with claw. Third pair not much shorter than second; fourth and fifth joints with the seta on the distal anterior angle somewhat long; sixth joint with the distal anterior seta somewhat long; seventh joint with

claw less than half as long as sixth joint. Sixth and seventh pairs (fig. 4c) much shorter than the anterior pairs; second joint about three and a half times as long as broad; fourth and fifth joints very moderately thickened towards their end, sixth joint somewhat long and slender, twice as long as seventh joint with claw.

Abdomen proportionately long, in the contracted specimen (fig. 4a) even slightly shorter than the three posterior thoracic segments combined. — Uropods (figs. 4a and 4d) long; endopod two-jointed, with first joint somewhat longer than second; exopod slightly shorter than the endopod, two-jointed, with the proximal joint about half as long as the distal.

Length of the largest specimen 1.50<sup>mm</sup>, of the contracted specimen (fig. 4a) 1.19<sup>mm</sup>.

Immature Male. A single specimen, only 1.0<sup>mm</sup> long, is at hand, and its most important parts are rendered in figs. 4e—4g. Some of the differences between this specimen and the two above-described females are due to sex, other differences probably to age. The antennulæ are considerably thicker than in the female; first joint, which is as long as the two other joints combined, is only three times as long as deep and tapers slightly towards the end; second joint is conspicuously less than twice as long as deep, third joint more than twice as long as the second. — Antennæ with fourth joint distinctly less than twice as long as the penultimate joint. — The chela is slightly thicker than in the female with the hand conspicuously less elongate in proportion to the length of the movable finger. — The anterior pairs of legs are a little thicker in proportion to length than in the larger female. Uropods with the rami equal in length.

Remarks. *T. eximius* is easily distinguished from all other species by its very slender chelipeds with the very elongate chelæ and the hand very long in proportion to the fingers. In all other features it is allied to *T. penicillatus* G. O. S., differing only in various minor particulars, among which the most conspicuous is the fact, that in *T. penicillatus* the exopod of the uropods (fig. 5c) reaches scarcely or slightly beyond the middle of the second joint of the endopod.

Occurrence. Taken by the "Ingolf" at a single station.

South-West of Iceland: St. 78: Lat. 60° 37' N., Long. 27° 52' W., 799 fm., temp. 4.5°; 3 spec.

## 27. *Typhlotanais penicillatus* G. O. Sars.

(Pl. IV, figs. 5a—5d.)

1881. *Typhlotanais penicillatus* G. O. Sars, Arch. for Math. og Naturv. B. 7, p. 39.

! 1896. — — — Account Crust. Norway, Vol. II, p. 25, Pl. XI, fig. 3.

The "Ingolf" specimens agree well with Sars' description and figures of this species excepting that the setæ on the chelipeds are considerably longer, but that may be due to an accident or a slight error. Furthermore Sars stated that the exopod of the uropods is one-jointed, while it is two-jointed in my specimens, but the articulation between the two joints is not always really distinct.

*T. penicillatus* is closely allied to *T. eximius* n. sp., but differs especially in having the chelipeds shorter and much thicker and in having the exopod of the uropods (fig. 5c) conspicuously shorter than the endopod; furthermore the antennulæ, antennæ and anterior thoracic legs (fig. 5a) are in my largest specimens conspicuously shorter and thicker than in *T. eximius*; third pair of legs with

a small spine on the posterior side and near the end of sixth joint. It agrees above all with *T. eximius* in having the carapace considerably longer than the two anterior thoracic segments combined, in having the antennulæ and antennæ terminating in extremely long setæ and in possessing an acute process (on fig. 5a overlapped and therefore rendered by dotted lines) on the ventral side of second thoracic segment. — The chelipeds are characteristic; the carpus is considerably longer than the basal joint and about two and a half times as long as deep; the chela is a little or somewhat longer than the carpus, between three and a half and four times as long as broad, and the movable finger is only a little shorter than the anterior margin of the hand.

Marsupium is not found in any of my specimens. Somewhat young specimens are on the whole more clumsy, with the appendages shorter and more robust than in nearly fullgrown specimens. The largest specimen at hand is 1.56<sup>mm</sup>. — In a specimen measuring 1.27<sup>mm</sup> the antennulæ (fig. 5d) are considerably thicker, shaped nearly as in the young male of *T. eximius*, and therefore I consider this specimen to be an immature male.

Occurrence. *T. penicillatus* was brought home by the "Ingolf" from two stations.

Denmark Strait: St. 90: Lat. 64° 45' N., Long. 29° 06' W., 568 fm., temp. 4.4°; 1 spec.

South-West of Iceland: St. 78: Lat. 60° 37' N., Long. 27° 52' W., 799 fm., temp. 4.5°; 15 spec.

Distribution. Sars established this fine species on two specimens taken by him "at Sauesund, west coast of Norway, from depths of 50 to 100 fathoms".

28. ***Typhlotanais inermis* n. sp.**

(Pl. IV, figs. 6a–6g.)

Female (without marsupium). Moderately robust, about five and a half times as long as broad. — Carapace (figs. 6a and 6b) about as long as the two following segments combined, slightly longer than broad, with the lateral margins slightly converging from the base to beyond the middle and then more curved to the antero-lateral angles which are somewhat removed from the outer base of the antennulæ; the distance between these angles is more than two-thirds as long as the breadth of the carapace in front of its posterior margin, and from each angle the anterior margin is directed inwards and somewhat forwards to the acute median angle, each half of this front margin being slightly concave; the result is, that the carapace is pentagonal.

Antennulæ nearly as long as carapace and half of the next segment combined, very slender. First joint is, seen from the side, between four and five times as long as deep and tapers considerably from somewhat beyond the base to the end (fig. 6a); seen from above (fig. 6b) this joint has the basal fifth very broad, the outer margin angular at the end of that fifth, and from this angle the joint, which is distinctly less than three times as long as broad, tapers strongly to the distal end; it is somewhat longer than the two other joints combined. Second joint slender; third joint more than twice as long as the second, very slender, with the terminal setæ very long, the longest being somewhat longer than the two proximal joints combined. — Antennæ of moderate length, rather slender; second joint somewhat expanded above, third scarcely thickened, fourth somewhat less than twice as long as the penultimate joint; some of the terminal setæ about half as long as the long setæ of the antennulæ.

Chelipeds (fig. 6c) moderately robust. Basal joint with the posterior protuberance somewhat short, posteriorly rounded; its hind margin rather distant from the lower front angle of second thoracic segment. Carpus a little longer than the basal joint and a little more than twice as long as deep, with both margins feebly convex. Chela (fig. 6d) as long as the carpus, a little more than three times as long as broad; movable finger somewhat longer than the anterior margin of the hand; fixed finger much broader than the movable, with about three teeth along the distal part of the incisive margin and the last tooth rectangular and much larger than the two other teeth.

Thoracic segments (fig. 6a) differ slightly in breadth; all are subrectangular with the angles a little rounded; the major part of their lateral margins parallel or feebly convex. Second segment conspicuously less than half as long as the third, without any process below. The segments increase in length from the second to the fifth and decrease from the fifth to the seventh, but the fourth segment is slightly longer than the third and slightly shorter than the fifth. — The anterior legs moderately long and slender. Second pair (fig. 6c) with a very long seta both from the anterior and the posterior distal angle of fifth joint; sixth joint about as long as fifth joint plus half of the fourth, with the distal setæ short; seventh joint with claw slightly longer than sixth joint. Third pair somewhat shorter than second; fourth joint with a long seta from the distal posterior angle, fifth joint with a very long seta both from the anterior and the posterior distal angle; sixth joint somewhat longer than fifth, with short setæ; seventh joint with claw distinctly more than half as long as sixth joint. Sixth and seventh pairs (fig. 6e) with the second joint somewhat widened, two and a half times as long as broad; fourth joint feebly tapering and with a short spine at the distal anterior angle (fig. 6f); fifth joint moderately broad, slightly broader towards the end and with a small, low, glabrous protuberance just before the end of the anterior margin and a minute spine at the end; sixth joint only a little longer than the fifth, very moderately slender, with a spine near the distal anterior angle; seventh joint with claw about half as long as sixth joint.

Abdomen somewhat longer than and as broad as the two preceding segments combined. — Uropods somewhat short; endopod (fig. 6g) two-jointed, with first joint slightly longer than the second; exopod slightly or a little longer than the proximal joint of the endopod.

Length of females without marsupium 2.3<sup>mm</sup>; females with marsupium unknown.

Immature Male. Differs from the female in the antennulæ, which are thickened as in the young male of *T. mucronatus*.

Remarks. This species is allied to *T. penicillatus*, but it is somewhat larger, a little more slender and differs in the shape of the carapace, in having seventh joint with claw of second and third pairs of legs much longer in proportion to the sixth joint, in possessing long or very long setæ on fifth joint of these legs, in having the exopod of the uropods considerably shorter and unjointed, and no ventral process on second thoracic segment. *T. penicillatus* is a warm water species, while *T. inermis* is known only from the cold area, with the temperature below zero.

Occurrence. This species has been taken by the "Ingolf" at four stations.

North of the Færoes: St. 141: Lat. 63° 22' N., Long. 6° 58' W., 679 fm., temp. ÷ 0.6°; 1 spec.

— - - — St. 138: Lat. 63° 26' N., Long. 7° 56' W., 471 fm., temp. ÷ 0.6°; 1 spec.

North of the Færoes: St. 139: Lat.  $63^{\circ}36'N$ , Long.  $7^{\circ}30'W$ , 702 fm., temp.  $\div 0.6^{\circ}$ ; 10 spec.  
East of Iceland: St. 102: Lat.  $66^{\circ}23'N$ , Long.  $15^{\circ}52'W$ , 750 fm., temp.  $\div 0.9^{\circ}$ ; 6 spec.

29. *Typhlotanais variabilis* n. sp.

(Pl. IV, figs. 7a—7d; Pl. V, figs. 2a—2c.)

Female. Moderately slender (fig. 7a), about six times as long as broad. — Carapace somewhat or considerably shorter than the two following segments combined, somewhat longer than broad, with the lateral margins convex posteriorly and their anterior two-thirds converging to the anterior angles; the anterior end slightly more than half as broad as the carapace somewhat before its posterior margin; the rostral process well developed, acute.

Antennulæ scarcely as long as the carapace and half of the next segment combined, rather slender (fig. 2a). First joint from a little more than four to five times as long as deep and, seen from the side or from above, tapering regularly from near the base to the end, considerably longer than the two other joints combined; second joint twice (fig. 2b) or conspicuously more than twice (fig. 2a) as long as deep and more than half as long as third joint; longest terminal seta slightly or somewhat longer than the two distal joints combined. — Antennæ of normal size; third joint scarcely thickened; fourth joint slightly or distinctly more than twice as long as the penultimate; terminal setæ conspicuously shorter than those of the antennulæ.

Chelipeds (fig. 2a) somewhat long, moderately slender. Basal joint with the posterior protuberance of moderate length; the distance between its hind margin and the front lower end of second thoracic segment about half as long as the joint. Carpus half as long again as the basal joint, three times or a little more than three times as long as deep, with the lower margin nearly straight. Chela somewhat longer than the carpus, not fully four times as long as broad; movable finger a little longer than the anterior margin of the hand; fixed finger much broader than the movable, with a feeble tooth near the end of the incisive margin.

Thoracic segments (fig. 7a) increase feebly in breadth from second to seventh. Second segment with the lateral margins feebly converging from the front to the posterior end. Third and fourth segments broadest somewhat before the middle, but the lateral angles at the broadest place of the segments are somewhat rounded and from thence the margins converge moderately to the hind margin. Fifth and sixth segments broadest somewhat from the posterior margin and their lateral margins are somewhat convex; seventh segment with the anterior half of the lateral margins convex, the posterior half straight. Second segment without any ventral process in the single female with marsupium and in a female of the same size with the ventral side of the anterior segments flat; in all other specimens the ventral side of the anterior segments is convex as in the subadult male (fig. 2c) and second segment has a conspicuous, acute ventral process projecting downwards and much forwards from the anterior part of the segment. — Thoracic legs of moderate length and rather slender. Second pair (fig. 2a) with the distal setæ on fourth and fifth joints somewhat short or moderately long; sixth joint as long as the fifth plus half of the fourth, with the distal setæ somewhat short; seventh joint with claw somewhat shorter than sixth joint. Third pair somewhat or rather considerably shorter

than second pair, because fourth, fifth and sixth joints are conspicuously shorter than in the last-named pair; the distal anterior setae on fourth, fifth and sixth joints somewhat long, and in one specimen the distal posterior seta on fourth joint was very long; seventh joint with claw distinctly more than half as long as sixth joint. Three posterior pairs of legs (fig. 7b) with second joint about three times as long as broad; fourth joint (fig. 7c) with two distal short spines on the anterior side; fifth joint somewhat thick, with a rounded expansion on almost the distal half of the anterior margin and a few tiny spinules on that expansion; sixth joint about as long as the fifth plus half of the fourth, twice as long as seventh joint with claw.

Abdomen not fully as long as the two preceding segments combined, but a little broader than the last thoracic segment. — Uropods somewhat long and slender (fig. 7d); endopod with the proximal joint a little or slightly longer than the distal; exopod distinctly longer and more slender than the endopod, two-jointed, and the distal joint almost twice as long as the proximal.

Length of a female with marsupium and of the largest female without marsupium 2.4<sup>mm</sup>.

Subadult Male. The antennulae are thick (fig. 2c); first joint only a little more than three times as long as deep and tapers a little towards the end; second joint about as long as deep; third joint with the proximal half somewhat thickened below. Ventral process on second thoracic segment well developed (fig. 2c). Abdomen a little longer than the two preceding segments combined.

Remarks. *T. variabilis* is easily distinguished from all other species of *Typhlotanais* mentioned here or found at Norway by having the exopod of the uropods distinctly longer than the endopod. In various features it is allied to *T. penicillatus*.

As to the variation in presence or absence of a ventral process on second thoracic segment I refer to the statements on p. 7.

Occurrence. *T. variabilis* has been taken by the "Ingolf" at three stations, all in the cold deep-sea area.

North of the Færoes: St. 139: Lat. 63° 36' N., Long. 7° 30' W., 702 fm., temp. ÷ 0.6°; 3 spec.

East of Iceland: St. 105: Lat. 65° 34' N., Long. 7° 31' W., 762 fm., temp. ÷ 0.8°; 3 spec.

— - — St. 102: Lat. 66° 23' N., Long. 10° 26' W., 750 fm., temp. ÷ 0.9°; 2 spec.

(One of these specimens, represented in fig. 2a, has a minute parasitic Copepod (*p*) fixed on the base of second left leg.)

### 30. *Typhlotanais trispinosus* n. sp.

(Pl. V, figs. 4a—4f.)

Female (without marsupium). Body slender, nearly seven and a half times as long as broad (fig. 4a). — Carapace about as long as the two following segments combined, somewhat longer than broad; its lateral margins converge slightly from near the base to somewhat from the front end where they are more curved; the front end is a little more than half as broad as the carapace near its base, and the rostral process is well developed, somewhat narrow, acute.

Antennulae (fig. 4b) nearly or scarcely as long as the carapace, moderately slender. First joint about three and a half times as long as deep, somewhat tapering and somewhat longer than the two

other joints combined; second joint considerably longer than deep; third joint conspicuously more than twice as long as the second, with the longest terminal seta about as long as the joint. — Antennæ rather long; second and third joints (fig. 4c) very thick, third joint on the lower side with three strong, spiniform and nearly hook-shaped processes directed much backwards; second joint with a similar process a little behind the front lower angle and sometimes besides a minute, acute denticle behind the hook; fourth joint is distinctly more than twice as long as the penultimate joint, and the terminal setæ nearly as long as those of the antennulæ.

Chelipeds (fig. 4b) somewhat long and strong. Basal joint with the posterior protuberance somewhat long and rounded behind; the distance between its hind margin and the lower front end of second thoracic segment distinctly more than one-third of the length of the joint. Carpus much longer than the basal joint and nearly three times as long as deep. Chela as long as the carpus and little more than three times as long as broad; movable finger nearly as long as the front margin of the hand; fixed finger inconsiderably thicker than the movable, with low teeth towards the end of the incisive margin.

Thoracic segments (fig. 4a), taken together, with the lateral margins parallel excepting in front and behind, as the margins of second segment converge somewhat from near the front end to the hind margin, while those of seventh segment converge in the opposite direction. Second segment somewhat or considerably shorter than the third, below a little behind the front angle with a somewhat small, subacute process directed mainly forwards (fig. 4b). Third, fourth and sixth segments nearly equal in length, nearly as long as broad and only a little shorter than fifth segment. — Thoracic legs somewhat short. Second pair (figs. 4b and 4d) with fourth joint distinctly longer than the fifth and without setæ; seta on the anterior angle of fifth joint somewhat short; sixth joint a little shorter than fifth and fourth joints combined, and the seta on the anterior side stiff and only a little longer than the diameter of the joint; seventh joint with claw about as long as fourth joint; the third joint on the posterior side with an extremely long, strong seta reaching the end of fifth joint. Third pair with the seta on third joint proportionately still longer than that on second pair; fourth, fifth and sixth joints conspicuously shorter than in second pair, but preserving the same proportion as to length and similarity as to setæ; seventh joint with claw considerably less than half as long as sixth joint. Fourth pair with the same enormous seta on third joint. Seventh pair (fig. 4e) is rather robust; second joint expanded, only about twice as long as broad; third joint scarcely distinguishable; fourth and fifth joints much widened, with curved rows of very fine spines on the outer side and on the convex margin; sixth joint is not much longer than the fifth, with some five minute incisions along the longest margin and at the end with a long seta and two strong, moderately long spines pectinate along the concave margin; seventh joint very short and the claw minute. Sixth pair of legs are a little, and fifth pair somewhat, more slender than seventh pair, with seventh joint conspicuously longer and thinner, while fourth and fifth joints are adorned in the main as in seventh pair.

Abdomen somewhat shorter than the two preceding segments combined. — Uropods short, both rami one-jointed and the endopod somewhat longer than the exopod.

Length 2 mm.

Remarks. *C. trispinosus* is closely allied to *T. tenuicornis* G. O. S. Both these species agree



with each other and differ from all other species known by two very peculiar characters: the lower side of second and third joints of the antennæ is furnished with strong, hook-shaped processes, and the third joint of the three anterior pairs of thoracic legs bears an extremely long seta. But before mentioning the differences between *T. trispinosus* and *T. tenuicornis* I may write some remarks on Sars' description and figures of the last-named species. I have studied some co-types presented to our Museum by Sars, and have drawn three analytical figures (Pl. V, figs. 3a—3c) for comparison with my figures of *T. trispinosus*.

Sars described and figured the antennæ of *T. tenuicornis* as having two strong hooks on third joint and none on second joint, but in his co-types I find two strong hooks on each of these joints (fig. 3a). Sars' figure of the second leg is not quite correct; I have found (fig. 3b) the very long seta on the posterior angle of fourth joint, but no seta on the posterior angle of fifth joint; it does not seem probable that the last-named seta exists though it has been drawn by Sars, but we have both figured a moderately short and thin and a rather long, strong seta on the anterior angle of that joint; finally, the seta on the anterior margin of sixth joint is very strong, nearly spiniform, and, as also drawn by Sars, more than half as long as the joint, and seventh joint with claw is only as long as fifth joint, being too long in Sars' figure. Third pair of legs (fig. 3c) nearly as drawn by Sars, excepting that fifth joint has a minute denticle — as in *T. trispinosus* — and no seta at the posterior distal angle, furthermore fourth joint has only a moderately long seta on the posterior angle. The three posterior pairs of legs have their fourth and fifth joints adorned with rows of very fine spines in the main as in *T. trispinosus*.

*T. trispinosus* differs from *T. tenuicornis* especially in the armature of second and third antennal joints and in the feebler development of setæ on fourth to sixth joints of second pair of legs. The difference in the armature of the antennal joints is easily seen from my descriptions and figures of these parts of both species. A comparison of my fig. 3b with fig. 4c shows that the two long setæ found on the posterior angle of fourth joint and the anterior angle of fifth joint of second legs in *T. tenuicornis* are wanting in *T. trispinosus*, furthermore that the stiff seta on sixth joint is proportionately twice as long in the former as in the latter species. Finally it may be pointed out that antennulæ, antennæ, chelipeds and thoracic legs are thicker in proportion to length in *T. trispinosus* than in *T. tenuicornis*. The last-named species is known only from the west coast of Norway, from depths ranging between 60 and 120 fathoms, and from Skager Rak, N. N. E. of the lighthouse of the Skaw, 125 fm. (H. J. Hansen).

Occurrence. *T. trispinosus* has been taken by the "Ingolf" at a single station.

Davis Strait: St. 36: Lat. 61° 50' N., Long. 56° 21' W., 1435 fm., temp. 1.5°; 17 spec.

### 31. *Typhlotanais profundus* n. sp.

(Pl. V, figs. 5a—5e.)

Female (without marsupium). Body moderately robust, not fully six times as long as broad (fig. 5a). — Carapace a little longer than the two following segments combined and about as long as broad; the lateral margins conspicuously convex and the anterior end slightly more than half as broad as the carapace somewhat before the posterior margin; the frontal process moderately large.

Antennulæ slightly longer than the carapace. First joint is even more than half as long again as the two other joints combined, seen from the side (fig. 5c) almost four times as long as deep and tapering much from near the base to the end; seen from above (fig. 5b) this joint is somewhat less than three times as long as broad and the distal half is much narrower than the proximal, which has the outer margin a little angular somewhat from the base and the limit between the proximal and the distal part incised and furnished with an outstanding seta. Second joint is, seen from the side, more than twice as long as deep; third joint is somewhat less than twice as long as the second, and its longest terminal setæ about as long as the first joint. — Antennæ (fig. 5c) of normal length; third joint is distinctly thickened, fourth joint slightly more than twice as long as the penultimate; terminal setæ only a little shorter than those of the antennulæ.

Chelipeds (fig. 5e) moderately stout. Basal joint somewhat long, with the posterior protuberance of middle length, rounded behind and reaching to near the front margin of second segment; carpus considerably longer than the basal joint and somewhat less than three times as long as deep. Chela slightly longer than the carpus, about three and a half times as long as broad and with the posterior margin considerably concave; movable finger as long as the anterior margin of the hand and a little narrower than the fixed finger.

Thoracic segments (fig. 5a) show a little difference in breadth. Second segment somewhat more than half as long as the third, anteriorly as broad as, or a little narrower than, the carapace, with the lateral margins somewhat converging to the posterior margin and below a moderately small ventral process curved forwards and originating near the front end. Third, fourth and sixth segments with their lateral margins nearly parallel and the corners rectangular; fifth and sixth segments with the lateral margins diverging a little from the anterior to the posterior end; third segment slightly shorter than the fourth, which is as long as the sixth, a little shorter than the fifth and half as broad again as long. — Thoracic legs of moderate length and thickness. Second pair (fig. 5e) with somewhat short setæ; sixth joint long, even a little longer than fifth plus half of the fourth; seventh joint with claw slightly longer than fifth joint. Third pair with fourth to sixth joint conspicuously shorter than in second pair; sixth joint only a little shorter than fourth and fifth joints combined, twice or more than twice as long as seventh joint with claw; setæ somewhat short. Three posterior pairs nearly as in *T. inaequipes* (comp. fig. 9a); second joint about two and a half times as long as broad; fourth joint with a minute tooth; fifth joint a little expanded; sixth joint somewhat slender and almost as long as the two preceding joints combined; seventh joint with claw of middle length.

Abdomen not broader than the posterior part of the thorax but somewhat longer than its two posterior segments combined. — Uropods short (fig. 5d); endopod two-jointed, with the proximal joint a little longer than the distal; the exopod reaches beyond the middle of second joint of the endopod and seems to be one-jointed.

Length of the largest specimen 1.76<sup>mm</sup>.

Subadult Male (fig. 5e). Antennulæ about as long as the carapace and half of the next segment combined, thick; first joint somewhat longer than the two other joints combined, seen from the side somewhat less than three times as long as deep and slightly tapering towards the end;

second joint about as deep as long; third joint twice as long as second, with the most proximal part feebly thickened below.

Remarks. This species is allied to *T. finmarchicus* G.O.S. and *T. mixtus* n. sp., but differs considerably in the antennulæ, which have much longer terminal setæ and the first joint in the female very differently shaped; furthermore the exopod of the uropods seems to be one-jointed in *T. profundus*, while it is distinctly two-jointed in the two other species.

Occurrence. *T. profundus* has been taken by the "Ingolf" at a single station.

South of the Davis Strait: St. 38: Lat.  $59^{\circ}12' N.$ , Long.  $51^{\circ}05' W.$ , 1870 fm., temp.  $1.3^{\circ}$ ; 4 spec.

### 32. *Typhlotanais spinicauda* n. sp.

(Pl. V, figs. 6a–6h.)

Female (without marsupium). Body somewhat slender, seven times as long as broad. — Carapace (fig. 6a) somewhat longer than the two following segments combined and considerably longer than broad, seen from above subcylindrical excepting its anterior third, which has the lateral margins converging forwards and distinctly convex; the anterior end almost two-thirds as broad as the base, with the frontal process of moderate size, acute.

Antennulæ (figs. 6a and 6c) conspicuously shorter than the carapace, somewhat robust. First joint more than half as long again as the two other joints combined, seen from the side little more than three times as long as deep and tapering very moderately; seen from above not quite two and a half times as long as broad and tapering regularly from base to end. Second joint short and slightly longer than deep; third joint nearly three times as long as the second, and its terminal setæ seem to be a good deal shorter than the joint. — Antennæ of normal length; third joint not thickened; fourth joint twice as long as the penultimate; terminal setæ considerably longer than those of the antennulæ.

Chelipeds (figs. 6b and 6d) of moderate length and thickness. Basal joint with the proximal protuberance scarcely as long as deep and its posterior margin not far from the front lower angle of second segment; carpus much longer than the basal joint, a little more than two and a half times as long as deep. Chela small, considerably shorter than the carpus, a little more than three times as long as broad; movable finger as long as the anterior margin of the hand; fixed finger near the base conspicuously broader than the movable.

Thoracic segments, seen from above, cylindrical with parallel margins. Second segment half as long as the third, with a conspicuous, oblong-triangular, acute, horizontal ventral process originating somewhat behind the front end of the segment (fig. 6b). Third and fourth segments with their front lateral angles produced in small, acute triangles only visible from the side (fig. 6b). — Thoracic legs short. Second pair (fig. 6e) somewhat slender with the setæ short; sixth joint as long as the fifth and half of the fourth combined; seventh joint with claw a little shorter than sixth joint. Third pair (fig. 6f) considerably shorter and distinctly thicker than the second, with short setæ; sixth joint a little shorter than the two preceding joints combined, seventh joint with claw conspicuously more than half as long as sixth joint. Sixth pair (fig. 6g) with the second joint somewhat expanded, slightly more than twice as long as broad; fourth and fifth joints rather broad and fourth joint with a distinct,

distal marginal tooth; seventh joint proportionately long, together with the short and thin claw slightly shorter than the sixth joint.

Abdomen at the middle of the hind margin with a short, protruding plate (fig. 6h), and each angle of the plate produced in a spiniform process; the distance between the end of each process and the hind margin is slightly longer than the breadth of the plate. — Uropods moderately long; endopod two-jointed (fig. 6h), with the proximal joint a little longer than the distal and with some minute spines along its inner margin; exopod a little shorter than the proximal joint of the endopod, two-jointed, with the joints equal in length.

Length of the single specimen 2.0 mm.

Remarks. *T. spinicauda* is easily distinguished from all other species by the plate with its two spines protruding from the end of abdomen; the uropods are also very characteristic. In several features it is allied to *T. finmarchicus* G. O. S.

Occurrence. Taken by the "Ingolf" at a single station.

Davis Strait: St. 28: Lat. 65° 14' N., Long. 55° 42' W., 420 fm., temp. 3.5°; 1 spec.

### 33. *Typhlotanais grandis* n. sp.

(Pl. V, figs. 7a—7e.)

Specimen without marsupium, probably an immature Male. Very large and somewhat slender, scarcely six and a half times as long as broad, but especially fifth thoracic segment is a good deal more narrow than carapace or abdomen (fig. 7a). — Carapace large, slightly longer than the two following segments combined and somewhat longer than broad; the lateral margins posteriorly convex but their anterior two-thirds converge nearly regularly to the front angles; the anterior end is a little more than half as broad as the carapace somewhat behind the middle; the rostral process is broad, somewhat short, acute.

Antennulae (fig. 7b) a little shorter than the carapace. First joint slightly longer than the two other joints combined, slightly more than two and a half times as long as deep and, seen from the side, scarcely tapering, seen from above distinctly and regularly tapering from base to end. Second joint a little deeper than long; third joint long, about three times as long as the second and its proximal fourth distinctly thickened above; terminal setae about as long as third joint. — Antennae of normal length and thickness; third joint scarcely expanded; fourth joint a little more than twice as long as the penultimate joint; terminal setae a little longer than those of the antennulae.

Chelipeds (fig. 7b) moderately robust. Basal joint long with the posterior protuberance even a little longer than deep, rounded behind, but its hind margin is somewhat distant from the front lower angle of second thoracic segment; carpus as long as the basal joint, only twice as long as deep. Chela somewhat longer than carpus, three times as long as broad, with the posterior margin straight; movable finger as long as the front margin of the hand; fixed finger near the base conspicuously broader than the movable and with a small tooth a little from the end of the incisive margin.

Thoracic segments (fig. 7a) increase much in length and decrease considerably in breadth from second to fifth segment; sixth segment is slightly longer and a little broader than the fifth, much longer

and somewhat narrower than the seventh. Second segment is about half as long as the third and tapers much in breadth from the anterior to the posterior end; it has a small, oblique ventral process from the lower front end. Third segment with the lateral margins considerably converging from the anterior to the posterior angles. Fourth segment with the lateral margins strongly angular considerably before the middle and from these angles converging towards both ends. Fifth segment slightly longer than broad, and its lateral margins strongly angular somewhat behind the middle; sixth segment with the lateral margins strongly angular still nearer the posterior margin; seventh segment increases much in breadth from the anterior end to rather near the hind margin. — Thoracic legs moderately long. Second pair (fig. 7b) with the setæ short excepting the seta on the posterior margin of sixth joint; fourth joint somewhat longer than the fifth and as long as the sixth; seventh joint with claw only two-thirds as long as sixth joint. Third pair with fourth joint shorter than the fifth, which is somewhat shorter than the sixth; fourth joint with some minute spines on the posterior margin, setæ on fourth and fifth joints short, distal seta on the anterior side of sixth joint rather long; seventh joint with claw scarcely half as long as sixth joint. Three posterior pairs of legs moderately strong (fig. 7c); second joint about two and a half times as long as broad; fourth joint (fig. 7d) with a row of very short, tooth-shaped, small spines along the distal half of its anterior margin and two much larger spines before the end; fifth joint with a close row of small tooth-shaped spines along the major part of the convex front margin, a similar, curved row on the outer side, and a moderately long, very thick spine at the distal end; sixth joint only a little shorter than the two preceding joints combined, moderately stout, with a large number of quite minute denticles along the anterior part, two moderately long and very thick spines near the end and three much longer terminal spines, two of which with a few strong teeth on the concave margin and the third with a number of denticles along the major distal part of the corresponding margin; seventh joint with claw somewhat short, on seventh pair less than half as long as sixth joint, and both joint and claw with some few denticles on the concave margin.

Abdomen broader than seventh thoracic segment, but scarcely as broad as the second, slightly longer than seventh segment and half of the sixth combined; its hind margin transverse, feebly angular at the middle. — Uropods (fig. 7e) moderately long, somewhat slender; endopod with the first joint a little longer than the second; exopod reaches slightly beyond the middle of second joint of the endopod, two-jointed, with second joint about two and a half times as long as the first.

Length of the single specimen 4.18<sup>mm</sup>.

Remarks. *T. grandis* is much larger than any other species of this genus found by Sars or the "Ingolf", but agrees in this respect with three species established by Dollfus (1897) on specimens taken by the Prince of Monaco. *T. grandis* is readily distinguished from the three last-named species by various characters (comp. Dollfus' figures) and from all forms seen by me by the peculiar armature of the posterior pairs of legs. In the shape of the thoracic segments *T. grandis* is somewhat similar to *T. irregularis*, but differs widely in several other features.

Occurrence. Taken by the "Ingolf" at a single station.

South of Iceland: St. 54: Lat. 63°08' N., Long. 15°40' W., 691 fm., temp. 3.9°; 1 spec.

34. *Typhlotanais plebejus* n. sp.

(Pl. V, figs. 8a—8g.)

Female (without marsupium). Body slender, almost eight times as long as broad, seen from above cylindrical (fig. 8a). — Carapace half as long again as broad and nearly longer than second, third and half of the fourth segment combined; the posterior halves of the lateral margins parallel, the anterior halves converging and distinctly convex; the front end somewhat more than half as broad as the carapace and the rostral process moderately developed, acute.

Antennulæ short, considerably shorter than the carapace. First joint (fig. 8b) somewhat longer than the two other joints combined, about three times as long as deep and moderately tapering from somewhat from the base to the end, seen from above nearly regularly tapering and about two and a half times as long as broad. Second joint slightly longer than deep; third joint about three times as long as the second, only moderately slender; terminal setæ a little shorter than third joint. — Antennæ somewhat long; third joint conspicuously thickened; fourth joint twice as long as the penultimate; terminal setæ somewhat shorter than those of the antennulæ.

Chelipeds (fig. 8c) rather robust. Basal joint very long, because the posterior protuberance is very elongate, more than half as long again as deep; carpus slightly longer than the basal joint, not fully two and a half times as long as deep. Chela somewhat small, somewhat shorter than the carpus and a little less than three times as long as broad, with the posterior margin conspicuously concave; movable finger somewhat shorter than the anterior margin of the hand; fixed finger at the base somewhat broader than the movable, with a low protuberance on the incisive margin a little from the end.

Thoracic segments all rectangular (fig. 8a), increasing in length from second to fifth and decreasing from fifth to seventh; second segment slightly shorter than the third, without ventral process; fifth segment considerably longer than the fourth and slightly longer than broad. — Thoracic legs on the whole somewhat short and robust. Second pair (fig. 8d) with fourth joint as long as the sixth joint; all setæ short. Third pair (fig. 8e) considerably shorter than second; fifth joint slightly longer than the fourth and not much shorter than the sixth, which is more than twice as long as seventh joint with claw; setæ short or moderately short. Fifth pair (fig. 8f) with second joint much expanded, scarcely twice as long as broad; fourth and fifth joints uncommonly broad and short; sixth joint slender and almost as long as fifth and fourth joints combined; seventh joint somewhat long and thin with a fine, curved claw. (Sixth and seventh pairs mutilated).

Abdomen almost as long as seventh, sixth and half of fourth thoracic segment combined. — Uropods somewhat short (fig. 8g); endopod distinctly two-jointed, with the first joint considerably longer than the second; exopod nearly as long as the proximal joint of the endopod, one-jointed.

Length of the single specimen 3.19<sup>mm</sup>.

Remarks. *T. plebejus* is allied to *T. aquiremis* Lilljeborg and *T. assimilis* G. O. S., but it is instantly distinguished from both by shorter chelæ, by having the exopod of the uropods one-jointed and especially by the very long posterior protuberance on the basal joint of the chelipeds. By the last-named character it is distinguished from all other species of the genus.

Occurrence. Taken by the "Ingolf" at a single station.

South of the Davis Strait: St. 38: Lat.  $59^{\circ} 12' N.$ , Long.  $51^{\circ} 05' W.$ , 1870 fm., temp.  $1.3^{\circ}$ ; 1 spec.

35. *Typhlotanais inaequipes* n. sp.

(Pl. V, figs. 9a—9b; Pl. VI, figs. 1a—1c.)

Female (without marsupium). Body slender, a little more than seven times as long as broad, seen from above nearly cylindrical (fig. 1a). — Carapace as long as or a little shorter than the two following segments combined, not fully half as long again as broad; its lateral margins are nearly parallel from the base to near the beginning of their distal third, where they begin to converge more distinctly; the anterior end is scarcely more than half as broad as the base and the rostral process is middle-sized, acute.

Antennulæ considerably shorter than the carapace (fig. 1c), somewhat slender. First joint, seen from the side, about or not fully three times as long as deep and tapering somewhat irregularly from somewhat from the base to the end; seen from above the joint (fig. 1b) is nearly three times as long as broad and tapers nearly regularly; the joint is somewhat or considerably longer than the two other joints combined. Second joint from a little less to a little more than half as long as the third and at most about twice as long as deep; longest terminal setæ distinctly longer than third joint. — Antennæ of normal length (fig. 1c); third joint somewhat thickened; fourth joint at most half as long again as the penultimate; terminal setæ about as long as those of the antennulæ.

Chelipeds (fig. 1c) somewhat long but only moderately robust. The basal joint somewhat long, its posterior process large, a little longer than deep with its rounded hind margin considerably distant from the front margin of second thoracic segment; carpus considerably longer than the basal joint, three and a half times as long as deep. Chela a little shorter than the carpus, a little less than four times as long as broad; movable finger a little shorter than the front margin of the hand; fixed finger at the base somewhat thicker than the movable.

Thoracic segments with the lateral margins parallel excepting on second and seventh segments, on which the margins converge feebly respectively from the front angles backwards and from behind forwards. Second segment about two-thirds as long as the third, without ventral process; fifth segment a little longer than the fourth or the sixth and scarcely as long as broad. — Thoracic legs moderately strong. Second pair (fig. 1c) quite peculiar; fourth joint very elongate, about two and a half times as long as the fifth; sixth joint slightly more than half as long again as the fifth; seventh joint with claw as long as the fifth; setæ short. Third pair normal; fourth and fifth joints subequal in length; sixth joint about half as long again as the fifth and more than twice as long as the seventh with claw; the setæ moderately short excepting a somewhat long, distal seta from the side of sixth joint. Three posterior pairs not very characteristic; second joint (fig. 9a) about two and a half times as long as broad; fourth joint with a minute distal tooth; fifth joint slightly broader than the fourth, with one of the margins somewhat convex but without any distinct armature; sixth joint moderately or rather slender, almost as long as the two preceding joints combined, with a minute spine somewhat before the end; seventh joint with claw of middle length.

Abdomen slightly broader than the posterior thoracic segments and scarcely as long as the

two preceding segments combined. — Uropods somewhat short; endopod (fig. 9b) two-jointed, with the first joint somewhat longer than the second; exopod reaching about the middle of the distal joint of the endopod, divided by a suture at or slightly beyond the middle and with the proximal part of its long terminal seta quite unusually thick.

Length 2.15<sup>mm</sup>.

Remarks. *T. inaequipes* is easily distinguished from all other species by the peculiarly elongate fourth joint of second thoracic legs. Antennæ, chelipeds and uropods afford various other characters, but the species is on the whole allied to *T. mixtus* n. sp.

Occurrence. Taken by the "Ingolf" at a single deep-sea station.

Davis Strait: St. 36: Lat. 61° 50' N., Long. 56° 21' W., 1435 fm., temp. 1.5°; 38 spec.

### 36. *Typhlotanais finmarchicus* G. O. Sars.

(Pl. VI, figs. 2a—2b.)

1881. *Typhlotanais finmarchicus* G. O. Sars, Arch. for Math. og Naturv. B. 7, p. 36.

1896. — — — G. O. Sars, Account Crust. Norway, Vol. II, p. 20; Pl. IX (Female and adult Male).

In the last-named work Sars has published a description and numerous figures of this species, which differs from all other forms of the genus, excepting *T. mixtus* n. sp., by some characters.

The antennulæ (fig. 2a) are shorter than the carapace, their first joint between more than half as long again and a little less than twice as long as the two other joints combined, about three times as long as deep; second joint conspicuously longer than deep; third joint more than twice as long as the second, with the longest terminal seta not fully as long as the joint. Second pair of legs somewhat short; sixth joint only a little longer or even shorter than seventh joint with claw. Third pair of legs with fourth and fifth joints uncommonly short in proportion to thickness, each being only about half as long again as broad; seventh joint with claw considerably more than half as long as sixth joint or only a little shorter than this joint.

Sars' figure of the carpus of the chelipeds is not correct, as its greatest depth is not situated at the end of the preceding joint, but much nearer the distal end; the carpus is between two and a half and two times as long as deep; the movable finger of the chela is a little or slightly shorter than the anterior margin of the hand. Sars' figure of the uropod does not agree with the uropods in my numerous specimens, among which some co-types presented by that author; I have drawn a normal uropod (fig. 2b) and this figure shows that in the endopod the proximal joint is less than half as long again as the distal, while in Sars' figure the proximal joint is about twice as long as the other: furthermore Sars' figure shows the proximal joint of the exopod to be almost longer than the distal, while I always found (fig. 2b) the proximal joint conspicuously shorter than the distal. Finally, it may be mentioned that the ventral side of second thoracic segment has frequently a rather small or very small, acute process originating behind the front end of the segment and directed essentially forwards, but sometimes this process could not be found in specimens where it might be expected. — As to all other features I refer to Sars; the differences between *T. finmarchicus* and *T. mixtus* are pointed out below.



Occurrence. *T. finmarchicus* has been taken by the "Ingolf" at three localities.

West Greenland: Mouth of Ameralik Fjord, at Godthaab, 5—70 fm., shells; 16 spec.

— — Inner end — — — — muddy bottom; 11 spec.

Jan Mayen: St. 115: Lat.  $70^{\circ}05'N$ , Long.  $8^{\circ}26'W$ , 86 fm., temp.  $0.1^{\circ}$ ; large number of specimens.

Furthermore *T. finmarchicus* has been taken at Iceland by various Zoologists and at Jan Mayen and East Greenland by the second Amdrup Expedition. The localities are given here.

West Iceland: Önundar Fjord, 11—12 fm., ooze and stones with a few algæ; 2 spec. Mag. W. Lundbeck.

East Iceland: Faskrud Fjord, 20—50 fm., blue clay; 7 spec. Mag. R. Hörring.

— — Nord Fjord, 40 fm.; 1 spec. Mag. R. Hörring.

— — Bakke Fjord, 8—10 fm.; black sand; 1 spec. Dr. A. C. Johansen.

Jan Mayen: 50—60 fm. and 55 fm., 17 spec. II<sup>a</sup> Amdrup Exp.

East Greenland: Cape Dalton: Lat.  $69^{\circ}24.6'N$ , ab. Lat.  $23\frac{1}{2}^{\circ}W$ , 9—11 fm.; 11 spec.

II<sup>a</sup> Amdrup Exp.

— — Turner Sound: Lat.  $69^{\circ}44'N$ , Long.  $23\frac{1}{2}^{\circ}W$ , 3 fm.; 1 spec. — —

— — Sabine Island: Lat.  $74^{\circ}30'N$ , Long.  $19^{\circ}45'W$ , 3—5 fm.; 23 spec.

II<sup>a</sup> Amdrup Exp.

Distribution. *T. finmarchicus* was previously known from Vadsø in Varanger Fjord (North-eastern Norway), where it occurred in 30 fathoms (G. O. Sars), and from Northbrook Island, Franz Joseph Land (Th. Scott). — The list given above shows that it has a wide distribution in the arctic and subarctic areas, while it is not known from the southern and south-western coasts of Iceland or from the Færoes.

It may be mentioned here that from the "Ingolf" Stat. 104: West of Iceland: Lat.  $66^{\circ}23'N$ , Long.  $7^{\circ}25'W$ , 957 fm., temp.  $\div 1.1^{\circ}$ , I have 2 specimens (an immature female and an immature male), of which especially the characteristic female certainly belongs to *T. finmarchicus*, though judging from their occurrence at that deep-sea station it would have been expected that they belonged to the closely allied *T. mixtus* n. sp. It is very improbable that *T. finmarchicus*, which has been taken at many localities in depths from 3 to 60 fathoms and never in a depth exceeding 86 fathoms, may occur in a depth of nearly a thousand fathoms; therefore I do not venture to insert that single deep-sea station in the list of localities, fearing that some error has been committed in one way or another, but the statement inexplicable at present is mentioned here.

### 37. *Typhlotanais mixtus* n. sp.

(Pl. VI, figs. 3a—3f.)

Female. Body slender, about seven times as long as broad, seen from above nearly cylindrical (fig. 3a). — Carapace somewhat or considerably longer than the two following segments combined, nearly half as long again as broad; lateral margins parallel to near the beginning of their distal third, then converging and distinctly convex; the anterior end not quite two-thirds as broad as the carapace, with the rostral process somewhat long, acute.

Antennulæ (figs. 3a and 3b) somewhat shorter than the carapace. First joint only somewhat longer than the two other joints combined — thus proportionately a good deal shorter than in *T. finmarchicus* — seen from the side about three times as long as deep and tapering considerably, seen from above tapering nearly regularly from near the base to the end. Second joint somewhat longer than deep, less than half as long as the third; longest terminal setæ considerably shorter than third joint. — Antennæ with third joint slightly thickened (fig. 3b); fourth joint not twice as long as the penultimate; terminal setæ almost longer than those of the antennulæ.

Chelipeds (fig. 3b) moderately long. Basal joint moderately long; the posterior protuberance a little longer than deep, and the distance between its hind margin and the front lower angle of second thoracic segment is more than half as long as the joint; carpus rather slightly longer than the basal joint, about three times as long as deep — thus less robust than in *T. finmarchicus*. Chela as long as the carpus, a little more than three times as long as broad; movable finger somewhat or a little longer than the anterior margin of the hand; fixed finger distinctly broader than the movable, with a couple of triangular teeth towards the end of the incisive margin.

Thoracic segments (fig. 3a) with their lateral margins subparallel excepting those of second segment which converge backwards. Second segment about half as long as the third, in females without marsupium generally with a moderately small or very small ventral process as in *T. finmarchicus*. Fifth segment slightly longer than the fourth or the sixth and slightly shorter than broad. — Thoracic legs somewhat short and robust. Second pair (fig. 3b) with fifth joint a little longer than the fourth and not twice as long as deep; sixth joint much longer than the fifth, about as long as or a little longer than seventh joint with claw; setæ moderately short. Third pair with fourth and fifth joints short in proportion to thickness; seventh joint with claw considerably more than half as long as the sixth; distal anterior seta on sixth joint moderately long. Three posterior pairs nearly as in *T. finmarchicus*; second joint about two and a half times as long as broad; fourth and fifth joints somewhat broad, each with a distal small spine; sixth joint about as long as fifth and half of the fourth combined; seventh joint somewhat long, together with the fine claw nearly as long as the sixth joint.

Abdomen slightly broader than seventh thoracic segment and about as long as seventh and sixth segments combined. — Uropods (fig. 3f) moderately short; endopod with the proximal joint somewhat longer than the distal; exopod scarcely reaching the middle of the distal joint of the endopod, with the distal joint a little longer than the proximal.

Length of a female with marsupium 1.94<sup>mm</sup>.

Subadult Male. The antennulæ (fig. 3c) considerably thicker than in the female; first joint about two and a half times as long as deep and tapering a little; second joint conspicuously deeper than long; third joint a little thickened below towards the base. — Length 1.0<sup>mm</sup>.

Remarks. *T. mixtus* might perhaps be considered a variety of *T. finmarchicus*, but according to my judgment it is a separate species; I have learned by experience that even small characters are not infrequently of specific value. *T. mixtus* differs from *T. finmarchicus* in having the first joint of the antennulæ conspicuously shorter in proportion to the two other joints combined, in having the carpus of the chelipeds less deep in proportion to its length and the movable finger of the chela longer in proportion to the front margin of the hand. — I have been unable to find any difference between

the specimens from 1435 fathoms in the warm area and specimens from depths ranging between 495 and 1060 fathoms in the cold area, and must therefore refer them all to the same species.

Occurrence. *T. mixtus* has been taken by the "Ingolf" at ten deep-sea stations, with a single exception in the cold area.

Davis Strait:	St. 36: Lat. 61° 50' N., Long. 56° 21' W., 1435 fm., temp. 1.5°; 6 spec.
North of the Færoes:	St. 141: Lat. 63° 22' N., Long. 6° 58' W., 679 fm., temp. ÷ 0.6°; 8 spec.
— - - —	St. 139: Lat. 63° 36' N., Long. 7° 30' W., 702 fm., temp. ÷ 0.6°; 8 spec.
East of Iceland:	St. 102: Lat. 66° 23' N., Long. 10° 26' W., 750 fm., temp. ÷ 0.9°; 4 spec.
North of Iceland:	St. 124: Lat. 67° 40' N., Long. 15° 40' W., 495 fm., temp. ÷ 0.6°; 1 spec.
— - —	St. 125: Lat. 68° 08' N., Long. 16° 02' W., 729 fm., temp. ÷ 0.8°; 6 spec.
North-East of Iceland:	St. 120: Lat. 67° 29' N., Long. 11° 32' W., 885 fm., temp. ÷ 1.0°; 1 spec.
— - —	St. 119: Lat. 67° 53' N., Long. 10° 19' W., 1010 fm., temp. ÷ 1.0°; 17 spec.
South of Jan Mayen:	St. 118: Lat. 68° 27' N., Long. 8° 20' W., 1060 fm., temp. ÷ 1.0°; 4 spec.
— - - —	St. 117: Lat. 69° 13' N., Long. 8° 23' W., 1003 fm., temp. ÷ 1.0°; 13 spec.

### 38. *Typhlotanais cornutus* G. O. Sars.

1879. *Paratanais cornutus* G. O. Sars, Arch. for Math. og Naturv. B. 4, p. 431.

1885. *Typhlotanais* — G. O. Sars, Norske Nordhavs-Exp., Crust. I, p. 83, Pl. VII, figs. 29—38.

1896. — — G. O. Sars, Account Crust. Norway, Vol. II, p. 24, Pl. XI, fig. 2.

Sars' figures and description in his last-named work are on the whole good, but it may be useful to enumerate a number of features, by the combination of which this species is separated from any other form.

*T. cornutus* is thicker than most species, being about four and a half times as long as broad. The carapace is a little or somewhat shorter than the three following segments combined. Antennulæ moderately slender, scarcely as long as the carapace, with the longest terminal setæ decidedly longer than the two distal joints combined. Chelipeds with carpus and chela equal in length and somewhat short in proportion to breadth; the movable finger a good deal shorter than the front margin of the hand. — Second thoracic segment half or less than half as long as third segment, which is conspicuously shorter than the fourth. Second pair of thoracic legs somewhat slender; sixth joint conspicuously longer than the seventh with claw, with its distal posterior seta somewhat long. Second joint of the posterior pairs of legs moderately thick. — Uropods with both rami two-jointed and the exopod conspicuously shorter than the endopod.

Among the characters pointed out by Sars that drawn from the well-developed rostrum seems to me less valuable, and it may be stated here that I have some co-types of Sars presented by himself. — In specimens with the ventral side of second thoracic segment convex a moderately small or somewhat large process projects downwards and much forwards, originating somewhat behind the front end of the segment.

Occurrence. Taken by the "Ingolf" at a single station.

Davis Strait: St. 32: Lat. 66° 35' N., Long. 56° 38' W., 318 fm., temp. 3.9°; 42 spec.

Distribution. According to Sars this species has been taken at Kvalo in the most northern part of Norway (Lat.  $70^{\circ} \frac{2}{3}$ ° N.) "from depths of 60—100 fathoms", and at a locality "about midway between Beeren Eiland and Finnmark", from 190 fathoms.

39. ***Typhlotanais solidus* n. sp.**

(Pl. VI, figs. 4 a—4 f).

Female (without marsupium). Body robust, only a little more than four times as long as broad (fig. 4 a). — Carapace even longer than the three following segments combined, slightly longer than broad (fig. 4 b); the postero-lateral angles broadly rounded, the major part of the lateral margins converging to near the front end, where they are rounded; the front end is scarcely half as broad as the carapace somewhat from its hind margin, and the rostral process is somewhat long, acute.

Antennulæ scarcely as long as the carapace (fig. 4 b), moderately robust. First joint half as long again as the two other joints combined, three and a half times as long as deep (fig. 4 c) and tapering regularly and somewhat feebly; seen from above (fig. 4 b) two and a half times as long as broad and tapering considerably. Second joint about twice as long as deep; third joint rather short, scarcely half as long again as the second, its longest terminal setæ distinctly longer than the two distal joints combined. — Antennæ (fig. 4 c) somewhat long; second and third joints considerably widened above; fourth joint not quite twice as long as the penultimate; longest terminal seta even slightly longer than that of the antennulæ.

Chelipeds (fig. 4 c) rather long but moderately robust. Basal joint with the proximal protuberance large, nearly as long as deep and reaching the front end of second thoracic segment; carpus long, considerably longer than the basal joint and three times as long as deep. Chela a little longer than carpus, three and a half times as long as broad; anterior margin of the hand almost half as long again as the movable finger; fixed finger at the base slightly broader than the movable, with a tooth near the end of the incisive margin.

Thoracic segments (fig. 4 a) increase in length and decrease a little in breadth from second to fifth, decrease in length and increase perceptibly in breadth from fifth to seventh; the lateral margins are very convex on second and third segments, moderately convex on the fourth segment, less convex but more or less distinctly angular towards or near the posterior margin on the three posterior segments. The three anterior segments combined scarcely longer than fifth and sixth segments together. — Anterior pairs of legs somewhat slender and moderately long. Second pair (fig. 4 d) with fifth joint a little longer than the fourth and somewhat shorter and thicker than the sixth, which is a little longer than seventh joint with claw; setæ short or wanting. Third pair only a little shorter than second; sixth joint a little longer than fifth and not fully twice as long as seventh with claw, with the upper distal setæ moderately long. Sixth and seventh pairs (fig. 4 e) considerably shorter than the anterior pairs, somewhat slender; second joint nearly three times as long as broad; fourth and fifth joints a little thickened, respectively with a single spine and two minute distal spines; sixth joint moderately slender and nearly as long as fourth and fifth joints combined; seventh joint very short with the claw minute, both together only about one-third as long as the sixth joint.

Abdomen slightly broader than seventh thoracic segment, as long as seventh, sixth and half of the fifth thoracic segment combined. — Uropods short (fig. 4 f); endopod rather robust, two-jointed, with the proximal joint distinctly longer than the distal; exopod nearly as long as the endopod, but more slender and without any perceptible articulation.

Length of the single specimen 1.85 mm.

Remarks. *T. solidus* is easily distinguished from the other species by its broad body and the shape of the thoracic segments; antennulæ, chelipeds and uropods afford further characters. The animal is yellow, and its exoskeleton seems to be more solid than in any other species of similar size. The specimen has the ventral side of the thoracic segments flat, consequently no ventral process on second segment, and seems to be full-grown.

Occurrence. Taken by the "Ingolf" at a single station.

South-West of Iceland: St. 78: Lat. 60° 37' N., Long. 27° 52' W., 799 fm., temp. 4.5°; 1 spec.

### <sup>7</sup> *Agathotanis* n. gen.

Body in the female and subadult male moderately slender, decreasing in breadth from the middle of the carapace to the base of abdomen, which is narrower than the last thoracic segment. Carapace about as long as the two following segments combined. No eyes. Antennulæ in the female three-jointed, with the first joint longer than the two others combined; in the subadult male the third joint has a transverse suture. Antennæ in the female (Pl. VI, fig. 5 c) quite rudimentary, consisting of a minute joint; in the subadult male (fig. 5 n) about as long as the proximal depth of the antennulæ.

Mandibles (fig. 5 d) small, with only the incisive part developed, while a movable lacinia and the molar process are completely wanting. Maxillulæ (fig. 5 f) consist of a single slender joint curved towards both ends; the terminal part has several thick spines and some fine hairs; the palp is only half as long as the joint, slender and very thin-skinned, with two terminal setæ. (Maxillæ not seen, rudimentary or wanting.) Maxillipeds (fig. 5 g) considerably reduced; the two proximal joints and the lobes are completely fused, constituting a circular, vaulted, strongly chitinized plate with a median fissure in its anterior part; the four-jointed palps with the terminal joint slender; the epipods — omitted in the figure — are subtriangular, small, thick plates.

Chelipeds slender. Thoracic legs very slender; second and third pairs completely similar; claw on the three posterior pairs very long (fig. 5 k). Seventh thoracic segment immovably fused with the abdomen and all abdominal segments immovably fused, but all seven segments are limited by moderately distinct, though feeble furrows (figs. 5 b and 5 o). Pleopods wanting in the female (fig. 5 b); in the subadult male (fig. 5 o) they are long, unjointed, slender and somewhat conical and all coalesced, constituting a kind of pyramid with longitudinal impressions between the pairs; each pleopod terminates in a few very short setæ. Uropods rudimentary, each being a small, subtriangular joint without any distinct division (figs. 5 l and 5 m).

The exoskeleton of the animals, excepting the walking legs, has a peculiar aspect and seems

to contain a large quantity of calcium, as it is firm but yet fragile. The walking legs are inserted in small holes in the firm wall of the segments.

Remarks. This genus, founded on some specimens of a single species, is the most aberrant type of the family hitherto discovered. The three most interesting features are: the rudimentary antennæ, the fusion of the last thoracic segment and all abdominal segments in a single portion with feeble furrows indicating the limits between the seven segments, finally the coalescence of all five pairs of long, unjointed pleopods in the subadult male.

In the number of joints in the antennulæ the genus shows affinity to the preceding genera *Paratanais* and *Typhlotanais*, while the similarity of second pair of legs with third pair resembles the features in *Leptognathia* and *Cryptocope*; the reduced mandibles are somewhat similar to those in *Tanaopsis*.

40. *Agathotanais Ingolfi* n. sp.

(Pl. VI, figs. 5a—5o.)

Female (without marsupium). Body about six and a half times as long as broad. — Carapace (fig. 5a) about as long as the two following segments combined, somewhat longer than broad, seen from above ovate, with the lateral margins considerably convex to near the front end which is a little less than half as broad as the base of the carapace and considerably less than half as broad as the carapace a little behind the middle; frontal process somewhat short and obtuse.

Antennulæ a little shorter than the carapace, moderately strong (fig. 5c). First joint considerably longer than the two other joints combined, about three and a half times as long as deep at the base, with the subdistal part as deep as the middle but a little narrowed between these places; seen from above it is distinctly thickened on the outer side both at the middle and near both ends. Second joint short, about half as long again as deep; third joint twice as long as the second, somewhat robust, with the terminal setæ shorter than the joint. — Antennæ consist of a minute conical joint terminating in a few setæ.

Chelipeds (figs. 5b and 5h) slender. Basal joint somewhat longer than deep, without any posterior protuberance, but attached to the cephalothorax by an oblique articulation, and the distance between this articulation and the front lower angle of second thoracic segment is about as long as the joint. Carpus about twice as long as the basal joint, between three and four times as long as deep, with the lower margin undulate. Chela about as long as the carpus, three times as long as broad; movable finger a little longer than the front margin of the hand; fixed finger near the base considerably broader than the movable, with three low, protruding angles on the distal part of the incisive margin.

Thoracic segments (fig. 5a) decrease in breadth from second to seventh. Third segment slightly longer than the second and slightly shorter than the fourth; fifth and sixth segments each somewhat longer than the others; seventh segment as long as second. Second segment not quite as broad as the carapace; broadest a little behind the anterior margin, tapering rapidly to the front angles and considerably to the posterior margin; third segment nearly as the second but its broadest part a little longer from the front end; fourth segment broadest not much before the middle and tapering to both

ends; on the three posterior segments their broadest part is behind the middle and in the seventh somewhat near the posterior margin. The broadest part of each segment has instead of lateral angles a pair of rounded protuberances on which the legs are inserted. — Thoracic legs moderately long and very slender. Second (fig. 5i) and third pairs completely similar (fig. 5b); fifth joint of very moderate length, with a somewhat long seta on the posterior angle; fifth joint very long, much longer than the fourth and slightly shorter than the sixth, with a very long seta from the anterior distal angle; seventh joint and claw equal in length and together somewhat shorter than sixth joint. Three posterior pairs of legs (fig. 5k) with second joint extremely long, about as long as the five following joints and the claw combined; sixth joint slightly longer than the fifth, and both these joints with some terminal spines, two of which are somewhat long; the claw much longer than seventh joint and sometimes even about as long as the sixth joint.

Abdomen somewhat shorter than the two posterior thoracic segments combined; the five segments somewhat narrower than seventh thoracic segment (fig. 5a); the last segment broadly cordiform, conspicuously broader than the preceding segment and as long as two segments combined. — Pleopods and uropods mentioned in the description of the genus.

Length of the largest specimen 3.8<sup>mm</sup>.

Subadult Male. The antennulæ (fig. 5n) are much thicker than in the female; first joint about three times as long as deep, and nearly as deep at the end as at the base, but narrower at the middle, as the lower margin of the joint is somewhat concave; second joint considerably deeper than long; third joint divided by a transverse suture a little before the middle and the proximal part marked off in this way much thicker than the distal. Antennæ consist of a single joint about three times as long as in the female, about as long as the depth of first antennular joint at its base. — Abdomen somewhat longer in proportion to the posterior thoracic segments than in the female; the pleopods have been described in the diagnosis of the genus.

Length of a subadult male 3<sup>mm</sup>.

Remarks. As to this extremely interesting species it may be sufficient to refer to the remarks on the genus. The animals are completely white.

Occurrence. Taken by the "Ingolf" at three stations in the warm area.

Davis Strait: St. 24: Lat. 63° 06' N., Long. 56° 00' W., 1199 fm., temp. 2.4°; 1 spec.

Denmark Strait: St. 10: Lat. 64° 24' N., Long. 28° 50' W., 788 fm., temp. 3.5°; 8 spec. (3 females, 3 males and 2 young spec.).

South of Iceland: St. 40: Lat. 62° 00' N., Long. 21° 36' W., 845 fm., temp. 3.3°; 1 spec.

### ♂ *Leptognathia* G. O. Sars.

This genus comprises 14 species already established in the literature. In the following pages 25 species are described, 19 of which are considered new to science. The genus is thus very large, comprising 33 species. For reasons mentioned on p. 9, I do not divide it into three or four genera, though it comprises types not only very different in general aspect but also showing considerable

differences in the shape of the molar processes of the mandible, in chelipeds, thoracic legs, pleopods and uropods. But being unable to say anything about the mandibles in several interesting species, because my material is too small, and being in doubt whether some of the characters are only of specific value or ought to be considered of higher importance, I confine myself to dividing the species described or mentioned in this report into four groups and two of these groups into sub-groups. This arrangement may, I hope, not only facilitate the determination of species but besides afford a general view of the relationships of the various species. It may be stated that the divisions are founded exclusively on the females, because in several species the pleopods are rudimentary or wanting in this sex but well developed in the subadult males.

Group a. *Uropods long, with both rami two-jointed and the exopod considerably shorter than the proximal joint of the endopod. Pleopods in the females well developed, biramous, with long setæ. Animals moderately slender or somewhat robust.*

The animals of this division, which may be named the *Sarsii*- or *longiremis*-group, are somewhat uniform in general aspect and allied in several features. Sars' figures of the female of his *L. longiremis* (= *L. Sarsii* H. J. H., not *L. longiremis* Lilljbg.) convey a fair idea of the aspect of the forms of this group. The body is moderately slender. The antennæ are seven-jointed, as fourth and fifth joints are separated by a well developed articulation. The basal joint of the chelipeds have the posterior protuberance well developed, with its posterior margin free and rounded. The thoracic legs are moderately slender, with long or moderately long spines; the three posterior pairs with seventh joint moderately long, considerably or much longer than the claw and both combined as long as or longer than the sixth joint. This group may be divided into three subdivisions.

- α.* The movable finger of the chelæ serrate along the anterior (upper) margin.  
Fifth abdominal segment without any hastate process.  
Species 41—43.
- β.* The movable finger of the chelæ without serration along the anterior margin.  
Fifth abdominal segment without any hastate process.  
Species 44—48.
- γ.* The movable finger of the chelæ without serration along the front margin.  
Fifth abdominal segment with the ventral protuberance produced in a long acute process directed more or less backwards.  
Species 49—51.

Group a, subdivision *α* (vid. above).

41. ***Leptognathia multiserrata*** n. sp.  
(Pl. VI, figs. 6a—6c.)

Female (without marsupium). General aspect as in *L. Sarsii* H. J. H. — Antennulæ slightly more than two-thirds as long as the carapace. First joint nearly longer than the three others combined



(fig. 6a), not fully three times as long as deep, tapering much from somewhat from the base to the end; second joint slightly longer than the depth of the first and considerably produced above; upper margin of third joint only half as long as that of the second; fourth joint scarcely as long as the upper margin of the second. — Antennæ with fifth joint almost half as long again as the fourth, which is slightly longer than the sixth.

Chelipeds (fig. 6b) extremely robust. Carpus a little more than half as long again as deep, with the major distal part considerably expanded downwards and the corresponding part of the lower margin much longer than the proximal portion, considerably convex and with some low, rounded saw-teeth along its proximal part, viz. that situated beyond the usual seta. Chela as long as the carpus, less than twice as long as broad; the distal part of the hand somewhat expanded anteriorly and the corresponding part of the anterior margin very convex and furnished with about six rounded saw-teeth, but without any protruding angle above the insertion of the movable finger. Both fingers thick; the movable finger somewhat shorter than the anterior margin of the hand, with a row of conspicuous, rounded saw-teeth along the major part of the proximal half of the anterior margin; the fixed finger with an oblong, low, subtriangular thickening at the usual setæ on the outer side, and the posterior margin of this thickening has a row of four strong, rounded saw-teeth; the incisive margin of this finger with three very conspicuous, obtuse, moderately low teeth.

Second and third pairs of thoracic legs (fig. 6c) quite similar, rather slender; posterior distal spine of fourth joint even longer than fifth joint; sixth joint about one-third as long again as the fifth and a little longer than seventh with claw. Three posterior pairs of legs (fig. 6d) have the seventh joint somewhat shorter than the sixth and adorned with a close row of extremely small setiform denticles.

The five anterior abdominal segments (fig. 6e) with the median row of ventral protuberances rounded and somewhat low, seemingly not strongly chitinized. Pleopods with the marginal setæ more than twice as long as the rami. Terminal segment with the sides evenly rounded. — Uropods about as long as the sixth plus half of the fifth abdominal segment (fig. 6e); the peduncle more than twice as long as deep and more than half as long as the first joint of the endopod; first joint of the endopod slightly longer than the second; exopod half as long as the first joint of the endopod.

Length of the single full-grown or nearly full-grown female without marsupium 3.5<sup>mm</sup>.

Remarks. This species is easily distinguished by having carpus and chela of the chelipeds proportionately broader than in any other species of this subdivision and besides by the peculiar shape of the chela with the rounded teeth at the posterior margin. — It may be added that the other specimen, which is so young, that seventh pair of thoracic legs are still wanting, has the carpus and the hand of the chelæ less expanded but showing all the characteristic crenulations.

Occurrence. Taken by the "Ingolf" at a single station.

East of Iceland: St. 4: Lat. 64° 07' N., Long. 11° 12' W., 237 fm., temp. 2.5°; 2 spec.

42. **Leptognathia Sarsii** H. J. Hansen.

(Pl. VI, figs. 7a—7f.)

1909. *Leptognathia Sarsii* H. J. Hansen, Vidensk. Medd. Naturh. Forening i Kjøbenhavn for 1909, p. 229<sup>1</sup>).

1896. — *longiremis* G. O. Sars, Account Crust. Norway, Vol. II, p. 27, Pl. XII (Not *Tanaïs longiremis* Lilljeborg).

Female. — Antennulæ nearly three-fourths as long as the carapace. First joint about as long as the three others combined (fig. 7a), scarcely two and a half times as long as deep, tapering considerably from the base to the end; second joint slightly longer than the depth of the first and somewhat produced above; third joint about half as long as the second; fourth joint distinctly shorter than the upper margin of the second. — Antennæ with fifth joint a little more than half as long again as the fourth, which is slightly longer than the sixth.

Chelipeds (figs. 7a and 7b) very robust. Carpus only about half as long again as deep, its distal half somewhat expanded downwards, but the convex lower margin of that part without crenulation. Chela a little longer than the carpus, twice as long as broad, somewhat triangular in outline; the distal part of the anterior margin slightly convex and furnished with some four to seven sharp or rounded, small saw-teeth; the terminal corner above the insertion of the movable finger is somewhat protruding, about rectangular. The outer side of the chela has a row of eight or nine protruding teeth situated nearly parallel with and a little removed from the posterior margin, the row beginning with the strongest tooth somewhat near the distal setæ of the posterior margin and going upwards on the hand where the teeth are gradually smaller and finally disappear. Half or more than half of the anterior margin of the movable finger is crenulate, with a number of either sharp and triangular or rounded saw-teeth, the finger itself somewhat shorter than the anterior margin of the hand. The subdistal part of the incisive margin of the fixed finger with three sharp saw-teeth, the distal tooth subdivided into two teeth.

The thoracic legs somewhat slender. Second (fig. 7c) and third pairs subequal; posterior terminal spine on fourth joint conspicuously shorter than fifth joint; sixth joint almost or fully half as long again as the fifth, slightly or distinctly shorter than the seventh with claw. Three posterior pairs of legs have the seventh joint (fig. 7d) somewhat shorter than the sixth and furnished with an either distinct or nearly indistinct row of minute, setiform denticles.

Five anterior abdominal segments with the ventral tubercles high and stroug (fig. 7e). Pleopods with the marginal setæ between half as long again and twice as long as the rami. Sixth abdominal segment (figs. 7e and 7f) with the lateral plate on each side produced downwards in a keel which generally projects in a very conspicuous, obliquely triangular, acute process directed downwards and backwards, but in some specimens (from four localities in Greenland) these processes are shorter and obtuse or very short and broadly rounded, but a protrusion is always distinct. — The uropods as long as the sixth and half of the fifth segment combined; the peduncle a little or somewhat less than twice as long as deep, but slightly more than half as long as the first joint of the endopod, which is

<sup>1</sup>) In a foot-note in his Arctic Crustacea I (Bihang Kgl. Sv. Vet. Akad. Handlingar, B. 26, Afd. IV, No 12, 1901) Ohlin stated that I had proposed the name *L. Sarsii* for this species.

conspicuously longer than the second joint; the exopod more than half as long as the proximal joint of the endopod.

Length of the largest specimen, a female with marsupium from the Sabine Island, is 5<sup>mm</sup> long, but the majority of the females are only 3.5–4<sup>mm</sup>.

Subadult Male. Antennulæ considerably thicker than in the female, five-jointed, the proximal third of the fourth joint being set off by an articulation and somewhat thickened; first joint somewhat shorter than the other joints combined, thick to the end; second joint scarcely as thick as the first and third joint rather thick. Abdomen distinctly a little longer and thicker in proportion to thorax than in the female. — Length 2.6–2.7<sup>mm</sup>.

Adult Male. Not seen by me, but I suppose that the adult male described and figured by Sars as belonging to his *L. longiremis* is the male of *L. Sarsii*. It has the two proximal joints of the antennulæ extremely broad and the chelæ uncommonly slender, while the thoracic legs have the sixth joint longer than seventh joint with claw.

Remarks. *L. Sarsii* is easily recognized from the other species by the rounded protruding keel or generally triangular process on the lower lateral surface of last abdominal segment and by the row of saw-teeth on the outer side of the chela a little from its posterior margin. In the shape of the hand and the crenulation of the movable finger it agrees with *L. gracilis* Krøyer and *L. graciloides* Lilljeborg. The form with the obtuse process or rounded lateral keel I name var. *obtusata*; it is certainly only a variety, as my material from the Sabine Island contains both specimens with the processes obtuse or much reduced. That *L. Sarsii* is identical with *L. longiremis* G. O. Sars as described and figured in his standard work is easily seen by the pair of processes on last abdominal segment. That the real *L. longiremis* Lilljeborg is another species is easily decided by two characters found in Lilljeborg's diagnosis of the female: "Manus... digito mobili lævi" and "Unguis pedum thor. 2:di paris brevis, et articulo unguifero multo brevior." This last-named species is described below.

Occurrence. The "Ingolf" has found this species at three stations.

North of Iceland:	St. 128: Lat. 66° 50' N., Long. 20° 02' W., 194 fm., temp. 0.6°; 1 spec.
— - —	St. 126: Lat. 67° 19' N., Long. 15° 52' W., 293 fm., temp. ÷ 0.5°; 7 spec.
— - —	St. 124: Lat. 67° 40' N., Long. 15° 40' W., 495 fm., temp. ÷ 0.6°; 4 spec.

Besides *L. Sarsii* has been taken by various Zoologists and the II<sup>d</sup> Amdrup-Expedition at a good number of localities.

West-Greenland, probably Egedesminde; 1 spec. (var. *obtusata*). Prof. D. Bergendal.

Færoes: Klaksvig, 10–15 fm.; about 70 spec. Dr. T. Mortensen.

East Iceland: Breidals Vig, 6 fm., mud and black sand; 28 spec. Dr. A. C. Johansen.

— — Seydis Fjord, 6 fm., black sand; 6 spec. Dr. A. C. Johansen.

— — Bakke Fjord, 8–10 fm., black sand; 9 spec. Dr. A. C. Johansen.

East Greenland: Angnagsalik, Lat. 65° 51' N.; 4 spec. (var. *obtusata*). Mag. Kruuse.

— — Cape Dalton, Lat. 69° 24' N., 9–11 fm.; 4 spec. II<sup>d</sup> Amdrup Exped.

— — Turner Sound, Lat. 69° 44' N., 3 fm.; 1 spec. (var. *obtusata*). II<sup>d</sup> Amdrup Exped.

— — North of Stewart Land (about at Lat. 70½° N.), 158 fm.; 2 spec. II<sup>d</sup> Amdrup Exped.

East Greenland: Sabine Island, about at Lat.  $74\frac{1}{3}^{\circ}$  N., 3—5 fm.; 15 spec. (the majority belonging to var. *obtusata*). II<sup>d</sup> Amdrup Exped.

Finally two specimens mentioned by Ohlin (1901) probably belong to this species; they were taken at the two following localities.

East Greenland: Lat.  $74^{\circ} 35' N.$ , Long.  $18^{\circ} 23' W.$ , 18—21 m., sandy mud; 1 spec.

— — Lat.  $77^{\circ} 9' N.$ , Long.  $14^{\circ} 40' E.$ , 90 m., soft grey clay; 1 spec.

Distribution. In the work quoted Sars has stated on his *L. longiremis*: "This species occurs along the whole Norwegian coast, from Christianiafjord to Vadso in depths ranging from 30 to 100 fathoms". Sars has presented the Copenhagen Museum with 25 specimens which must be considered co-types of his *L. longiremis*, but only 13 of these specimens show the characteristic shape of sixth abdominal segment and belong consequently to *L. Sarsii* H. J. H., while 4 specimens belong to *L. gracilis* Kr. as interpreted below and 8 specimens must be referred to the real *L. longiremis* Lilljeborg. The result is that Sars' utterances on the occurrence of his *L. longiremis* along the whole Norwegian coast are valueless, but it remains certain that *L. Sarsii* has been taken at Norway, and I suppose only at the Finmark, because all above-named localities, where this species has been captured by Danish or Swedish explorers, have an arctic character.

#### 43. *Leptognathia gracilis* Krøyer.

(Pl. VII, figs. 1a—1d).

1847. *Tanais gracilis* Krøyer, Naturh. Tidsskr. 2. R. B. II, p. 408.

? — — Krøyer, Voy. en Scand. Crust. Pl. 31, fig. 4, a—i.

1877. — *islandicus* G. O. Sars, Arch. for Math. og Naturv. B. II, p. 346.

1885. *Leptognathia longiremis* G. O. Sars, Norske Nordhavs-Exped., Crust. I, p. 79, Pl. 7, figs. 17—27.

Female. This species is so closely allied to *L. Sarsii* that it may be sufficient to point out the differences and make mention of some features. — The antennulæ (fig. 1a) a little more slender than in *L. Sarsii*; first joint distinctly more than two and a half times as long as deep, somewhat tapering and as long as the three other joints combined; second joint conspicuously longer than the depth of the first, somewhat produced above; upper margin of third joint about half as long as that of the second; fourth joint nearly as long as the second. — Antennæ as in *L. Sarsii*.

Chelipeds (figs. 1a and 1b) scarcely as robust as in *L. Sarsii*; carpus only a little less than twice as long as deep. Chela slightly longer than carpus, nearly twice as long as broad, somewhat triangular in aspect; the hand is less or more protruding and angular above the insertion of the movable finger, and the crenulation on the distal part of the anterior margin is distinct or rudimentary; the outer side of the chela has no row of small tubercles as in *L. Sarsii*, while a longer or shorter part of the front margin of the movable finger is distinctly crenulate.

Second and third pairs of thoracic legs subequal; posterior terminal spine of fourth joint considerably shorter than fifth joint (fig. 1c); sixth joint not quite half as long again as the fifth; seventh joint with claw a little or conspicuously longer than the sixth joint.

Abdominal segments as in *L. Sarsii* excepting that the sixth segment has no trace of any pro-

truding lateral process or keel. — Uropods (fig. 1d) in the main as in *L. Sarsii*; peduncle about twice as long as deep, a little more than half as long as first joint of the endopod, and this joint is somewhat longer than the second; exopod scarcely more than half as long as the proximal joint of the endopod.

Length of a female without marsupium from Greenland 3.2 mm; an ovigerous female from Norway is 2.2 mm long.

Remarks. This species is, in my opinion, well separated from *L. Sarsii* by the absence of a row of teeth on the outer side of the chela and by having the last abdominal segment simple, without any acute or rounded lateral process.

In the revised list of the Danish species of most orders of Malacostraca (1909) I referred *L. graciloides* Lilljeborg to *L. gracilis* Kr. Having re-examined the Danish specimens I prefer now to refer them to *L. graciloides* which is re-established as a species closely allied to *L. Sarsii* and *L. gracilis*. *L. graciloides* agrees with *L. Sarsii* in having a row of tubercles on the outer side of the chela, but the anterior margin of the movable finger has only about five sharp saw-teeth, and the last abdominal segment has, as in *L. gracilis*, no trace of a lateral process; it differs from *L. gracilis* in possessing the row of tubercles on the outer side of the chela, and the carpus of the chelipeds has the distal half more expanded downwards, so that the lower margin of the carpus is at the middle considerably more incised as in *L. gracilis* and even more than in the figure of *L. Sarsii* (Pl. VI, fig. 7a); finally the uropods have the exopod considerably more than half as long as the first joint of the endopod. Length of the Danish specimens, among which a couple of ovigerous females, 2.2—2.5 mm.

As to Kröyer's specimen and description I refer to my remarks (p. 230—31) in the paper on the Danish fauna; it is clear that my application of the Kröyerian name is not quite certain, but I have used it, as I did not like to cancel it.

Occurrence. This species has been captured by the "Ingolf" at a single locality.

West-Greenland: Ameragdlá (inner end of Ameralik Fjord, near Godthaab), muddy bottom,  
11 spec. (some of them young).

According to Sars his specimens of *L. islandicus* or (in 1885) *L. longiremis*, which seem to belong to *L. gracilis*, were taken at Iceland, harbour of Reykjavik.

Distribution. As already mentioned, I found a few specimens of *L. gracilis* between co-types of *L. longiremis* given by G. O. Sars and taken at Norway. The Copenhagen Museum possesses 3 small specimens from the Kara Sea, 50 fathoms. Kröyer's specimen was from Spitzbergen. Specimens taken in the deep water off Aberdeen and in the Moray Firth were determined by Th. Scott as *L. (?) longiremis* Lilljeb., but according to his description and figures the specimens probably belong to *L. gracilis*.

Group a, subdivision  $\beta$  (vid. p. 66).

#### 44. *Leptognathia Hanseni* Vanhöffen

(Pl. VII, figs. 2a—2l).

1907. *Leptognathia hanseni* Vanhöffen, Zool. Jahrb., Abth. für System. Bd. XXV, p. 513, Taf. 20, Fig. 13—15.

Female. General aspect about as in *L. gracilis*. — Antennulæ (fig. 2a) on the whole a little

more robust. First joint a little longer than the three other joints combined, a little more than two and a half times as long as deep, moderately tapering; second joint about as long as the depth of first joint, moderately produced above and somewhat thick; upper margin of third joint half or more than half as long as the second; fourth joint decidedly shorter than the second. — Antennæ with fourth joint scarcely half as long again as the fifth, as long as or shorter than the sixth.

Chelipeds (figs. 2a and 2e) somewhat robust; carpus a little or somewhat less than twice as long as deep, with the distal half distinctly expanded downwards and the corresponding part of the lower margin moderately convex. Chela slightly or a little longer than the carpus, somewhat more than twice as long as broad, thus conspicuously less broad than in the three preceding species; the hand is oblong but not subtriangular, its anterior margin without crenulation and about half as long again as the movable finger, the distal part above the insertion of the finger flatly rounded or obtuse. The margin of the movable finger and the outer side of the chela without crenulation. The fixed finger with three teeth along the distal portion of the incisive margin and the last tooth cleft.

The thoracic legs moderately slender. Second and third pairs subequal (fig. 2b); posterior terminal spine of fourth joint much shorter than fifth joint; sixth joint about half as long again as the fifth, but a little or very conspicuously shorter than seventh joint with claw. Posterior pairs (fig. 2c) with the sixth joint about half as long again as the seventh, which has a row of very fine and short, setiform denticles.

The five anterior abdominal segments (fig. 2d) with the median row of ventral tubercles high and strong; lateral plates of sixth segment without any expansion or process. The pleopods with the setæ about twice as long as the rami. — Uropods about as long as the two posterior segments combined; the peduncle nearly twice as long as deep, more than half as long as first joint of the endopod; second joint of the endopod conspicuously or even considerably shorter than the first; exopod a little more than half as long as the first joint of the endopod.

Length of a large female without marsupium 3.3<sup>mm</sup>, of a female with marsupium 2.1<sup>mm</sup>.

Subadult Male. Antennulæ much thicker than in the female, five-jointed, the proximal third of fourth joint being set off by an articulation and somewhat thickened; the first joint is thick to the end, second almost as thick as the first, and third joint rather thick. Abdomen a little longer and distinctly thicker than in the female.

Adult Male (figs. 2f—2l). This description is based on the single "Ingolf" specimen; Vanhöffen's specimen is mentioned in "Remarks". — Antennulæ with first and second joints very thick (fig. 2f); second joint is somewhat more than half as long as the first and slightly longer than the seventh, which is a little longer than the sixth; bundles of sensory setæ originate from the lower distal end of fourth, fifth and sixth joints.

Chelipeds (figs. 2f—2h) somewhat robust; carpus scarcely half as long again as deep. Chela not fully half as long again as the carpus, slightly more than twice as long as broad and nearly as broad as the depth of the carpus; anterior margin of the hand nearly half as long again as the movable finger, which has its incisive margin irregularly serrate from the base to the middle, while the corresponding margin of the fixed finger is somewhat convex and very finely serrate along nearly

three-fourths of its length; the inner side of the hand (fig. 2h) with a subdistal, transverse row of peculiar light but broad setæ.

Second pair of thoracic legs (fig. 2i) thinner than in the female, with the sixth joint scarcely half as long again as the fourth and as long as seventh with claw. Three posterior pairs of legs (fig. 2k) with sixth joint somewhat longer than the fifth and slightly shorter than the seventh, which is about two and a half times as long as the claw.

Sixth abdominal segment (fig. 2l) posteriorly produced into a small, rounded tip. — Endopod of the uropods somewhat longer than the exopod, two-jointed, with the first joint a little longer and considerably thicker than the second, before the middle on the upper half of the outer side with some fine hairs placed in a transverse row.

Length of the specimen 1.3<sup>mm</sup>.

Remarks. *L. Hanseni* is sharply separated from the three preceding species by the more oblong chelæ without any serration on the anterior margin of hand or finger; from *L. longiremis* Lilljeborg and *L. inermis* n. sp. it is easily distinguished by the much longer "claw" (seventh joint plus claw) on second and third pairs of legs. As to the male described, which is easily seen to belong to *Leptognathia*, I am sure that it belongs to the female, because it has been taken together with a large number of females and immature males and cannot belong to any other species known from West Greenland excepting *L. Sarsii* and *L. gracilis*, but no female of any of these species has been taken at Ameralik, and the male described by Sars as belonging to his *L. longiremis* probably belongs to *L. Sarsii* and differs widely in some features.

Then the determination of the present species. In the paper on the marine Malacostraca of West Greenland (1887) I mentioned a specimen which did not agree with *L. longiremis* as interpreted and figured by Sars in the Norwegian North-Atlantic Expedition, because the chelæ had no serration; I named it "*?Leptognathia longiremis* Lilljeborg" and added figures of antenna, chela and uropod. According to these figures the specimen (which belongs to the Riks Museum in Stockholm) is certainly identical with the species described here as *L. Hanseni* Vanh. Later Vanhöffen captured several specimens of a species in Karajok Fjord (not very far from Kekertak); he found that his females agreed with my remarks and figures and finding no positive facts which made it necessary to refer the form to the real *L. longiremis* Lilljeborg, he named it *L. hanseni*, described and figured the male but unfortunately not the more important female. As his male differs from my above-described specimen in a couple of features to be discussed presently, I asked Dr. Vanhöffen to lend me a few specimens; I received the whole material, six females and an adult male, and I beg the Direction of the Berlin Museum and Dr. Vanhöffen to accept my sincere thanks. The females captured by Dr. Vanhöffen agree perfectly with my specimens from other localities, but the male must be mentioned separately.

Dr. Vanhöffen's specimen is 1.5<sup>mm</sup>, thus distinctly a little larger than mine. He figured the endopod of the uropod as three-jointed, but it is in reality only two-jointed, as no articulation is found at the base of the transverse row of fine hairs. His figure of the chela does not agree completely with my specimen, but an examination of his specimen, which has both chelæ closed and the finer structure of the incisive margins somewhat indistinct, does not reveal any real difference worth men-

tioning. In his specimen the posterior legs have the seventh joint a little shorter and the claw longer (viz. half as long as seventh joint) than in my specimen. The only important difference between the two specimens is that in the antennulæ the seventh joint is considerably or rather much shorter than the sixth in Vanhöffen's specimen, a little longer than the sixth in my specimen. But in spite of this difference, I think that both males belong to the same species. In males of *Leptognathia breviremis* I have observed a conspicuous variation in the length of seventh antennular joint. The female of *L. longiremis* is allied to *L. Hanseni*, but the male of *L. longiremis* differs strongly from that of *L. Hanseni* in the armature of the chelæ and the extreme length of seventh joint with claw on the posterior pairs of thoracic legs (vid. Lilljeborg and my figures published in 1910). The male figured by Sars as belonging to his *L. longiremis* differs also widely from that of *L. Hanseni*. Consequently I am induced to think that the specific differences between males of different species of this group *a* are much larger than between Vanhöffen's specimen and my own, and that the differences observed between these two specimens are due only to variation.

Occurrence. Taken by the "Ingolf" at a single locality.

West Greenland: Mouth of Ameralik Fjord, near Godthaab, 5—70 fm., shells; more than a hundred females and immature males, and one adult male.

*L. Hanseni* has besides been taken at several other places in Greenland by various Zoologists.

West Greenland: Karajok Fjord, ab. Lat. 70° 20' N.; several spec. Dr. E. Vanhöffen.

— — Kekertak, Lat. 69° 58' N., 35—40 fm., clay; 1 spec. Nordenskjöld Exped. 1870.

East Greenland: Angmagalik, ab. Lat. 65½°; 2 spec. Mag. Kruuse.

— — — 4—11 fm.; 2 spec. Ryder Exped.

— — Tasiusak, Lat. 65° 37' N., 20—30 fm., stones with algæ; 1 spec. 1<sup>st</sup> Amdrup Expedition.

— — Cape Dalton, Lat. 69° 24.6' N., 9—11 fm.; 2 spec. 11<sup>d</sup> Amdrup Exped.

— — Denmark Island, Lat. 70° 27' N.; 1 spec. Ryder Exped.

The species is hitherto only known from Greenland.

#### 45. *Leptognathia longiremis* Lilljeborg.

(Pl. VII; figs. 3a—3e.)

1864. *Tanaïs longiremis* Lilljeborg, Bidrag till kännedomen om de inom Sverige och Norrige förekr. Crust. af ... Tanaidernas familj, p. 19 (Female and adult male).

1910. *Leptognathia longiremis* H. J. Hansen, Vidensk. Medd. Naturh. Forening i Kjobenhavn for 1909, p. 229, Pl. V, figs. 3a—3b.

Female. General aspect as *L. Hanseni*. — Antennulæ (fig. 3a) moderately strong. First joint a little longer than the three other joints combined, somewhat less than three times as long as deep, moderately tapering; second joint slightly longer than the depth of first joint, considerably produced above and somewhat thick; upper margin of third joint less than half as long as that of the second; fourth joint a little shorter than the second. — Antennæ as in *L. Hanseni*.

Chelipeds (fig. 3a) nearly as in *L. Hanseni*; carpus a little less than twice as long as deep;



the distal half somewhat expanded downwards with its lower margin oblique or distally nearly angular. Chela a little longer than the carpus and somewhat more than twice as long as broad, without any serration excepting the four teeth on the distal half of the incisive margin of the movable finger; the anterior margin of the hand considerably longer than the movable finger and its distal part above the insertion of the finger rounded.

The thoracic legs are rather slender. Second and third pairs similar (fig. 3b); spine on the posterior angle of fourth joint somewhat shorter than fifth joint, which is at least more than twice as long as broad; sixth joint nearly half as long again as the fifth and somewhat or considerably longer than seventh joint with claw. Three posterior pairs with sixth joint as long as or slightly longer than seventh joint with claw (fig. 3c); the row of minute denticles on seventh joint scarcely distinct.

Five anterior abdominal segments (fig. 3d) with the ventral tubercles high and strong as in *L. Hanseni*; lateral plates of sixth segment without any expansion or process. Pleopods with their setae very long, about three times as long as the rami. — Uropods (figs. 3d and 3e) somewhat shorter than the two preceding segments combined; peduncle not fully twice as long as deep, conspicuously more than half as long as the first joint of the endopod; the last-named joint from slightly longer to a little shorter than the second joint; exopod distinctly more than half as long as first joint of the endopod.

Length of a fine female without marsupium 2.9<sup>mm</sup>, a female with marsupium is 2.8<sup>mm</sup>. (Females with marsupium from Norway vary from 2.4<sup>mm</sup> to 3.2<sup>mm</sup> in length.)

Subadult Male. The differences between this animal and the female completely as in *L. Hanseni*.

Adult Male. This sex has been described by Lilljeborg, and in the above-named paper I published a couple of analytical figures. I have only seen the single Danish specimen.

Remarks. In the oblong chelae without any serration *L. longiremis* agrees with *L. Hanseni* and differs sharply from the three other preceding species; by having seventh joint with claw of second and third pairs of thoracic legs conspicuously shorter than sixth joint it differs from *L. Hanseni*, while it is easily separated from *L. inermis* by the ventral row of well developed tubercles on the five anterior abdominal segments, by much larger difference between the length of the two proximal antennular joints, etc. That this species is the real *L. longiremis* has been pointed out by me in 1910; especially Lilljeborg's above-quoted description in his Latin diagnosis of second pair of legs together with his statement on the chela: "digito mobili laevi" proves the correctness of my interpretation.

Occurrence. It has been taken by the "Ingolf" at five stations.

Davis Strait: St. 25: Lat. 63° 30' N., Long. 54° 25' W., 582 fm., temp. 3.3°; 17 spec.

South-West of Iceland: St. 78: Lat. 60° 37' N., Long. 27° 52' W., 799 fm., temp. 4.5°; 8 spec.

East of Iceland: St. 4: Lat. 64° 07' N., Long. 11° 12' W., 237 fm., temp. 2.5°; 2 spec.

North-East of Iceland: St. 120: Lat. 67° 29' N., Long. 11° 32' W., 885 fm., temp. ÷ 1.0°; 4 spec.

— — — St. 119: Lat. 67° 53' N., Long. 10° 19' W., 1010 fm., temp. ÷ 1.0°; 6 spec.

Furthermore it has been taken by the II<sup>d</sup> Amstrup Expedition at a single locality.

Jan Mayen, 55 fm.; 2 spec.

**Distribution.** Lilljeborg examined specimens taken off Bohuslän and at Molde (west coast of Norway at Lat.  $62^{\circ}42'$  N.). Material from Norway determined by Sars contained, as already stated, several specimens of this species together with two other species. In 1910 I enumerated two localities in Skager Rak, 110 and 125 fm., and one locality in Kattegat, 20 fm. — All other localities for *L. longiremis* mentioned in the literature ought to be discarded as doubtful or erroneous, and the material in question re-examined by the aid of the present paper.

46. **Leptognathia inermis** n. sp.

(Pl. VII, figs. 4a–4g.)

**Female.** The antennulæ (fig. 4a) differ conspicuously from those in the preceding forms. First joint is robust, considerably shorter than the three other joints combined, only twice as long as deep and somewhat tapering; second joint is thick and long, with its upper margin somewhat longer than the depth of the first joint and it is somewhat produced above; third joint with its upper margin not fully half as long as the second; fourth joint somewhat shorter than the second. — Antennæ with fifth joint more than half as long again as the fourth, which is distinctly shorter than the sixth.

Chelipeds (figs. 4a and 4b) robust. Carpus extremely deep, only about half as long again as deep, with the distal half conspicuously or, generally, strongly expanded downwards and the corresponding part of the lower margin very convex, nearly semicircular. Chela as long as or a little longer than the carpus, from slightly more to distinctly less than twice as long as broad, thus rather broad, with the distal anterior corner of the hand at the insertion of the movable finger angular and frequently protruding, subrectangular or even with a subacute angle; movable finger uncommonly broad towards the base; with the anterior margin glabrous excepting in a single immature specimen (from East Greenland) which has nearly half of this margin sinuate, with three impressions (fig. 4g); fixed finger with three teeth on the distal part of the incisive margin, but these teeth are frequently obtuse and one or two among them poorly developed.

The thoracic legs are somewhat shorter and thicker than in the five preceding species. Second and third pairs subsimilar (figs. 4c and 4d); the spine from the distal posterior angle of fourth joint very long, from a little longer to somewhat shorter than fifth joint; the last-named joint varies considerably in breadth, being sometimes twice as long as broad, but most frequently broader, even only somewhat longer than broad, with the posterior margin straight or with a couple of low serrations; (perhaps the extreme breadth is due to compression originating from the influence of alcohol); sixth joint considerably longer than, sometimes even half or slightly more than half as long again as, the fifth and always considerably longer than seventh joint with claw. Posterior pairs of legs (fig. 4e) with sixth joint about as long as seventh plus the short claw; seventh joint with the row of minute setiform denticles more or less distinct.

Five anterior abdominal segments (fig. 4f) without any ventral median row of real tubercles, as the lower median margin of each segment is, seen from the side, rather flatly convex. Pleopods as in *L. longiremis*. Sixth abdominal segment, seen from the side (fig. 4f), generally, and in full-grown specimens probably always, more flatly convex than in all preceding species. — Uropods longer than

the two posterior abdominal segments combined; peduncle somewhat or considerably less than twice as long as deep, about half as long as the first joint of the endopod; second joint of the endopod slightly or a little shorter than the first; exopod distinctly more than half as long as first joint of the endopod.

Length of a large female without marsupium 2.8<sup>mm</sup>, of a female with marsupium 2.15<sup>mm</sup>.

Subadult Male. Antennulæ only four-jointed, but the two proximal joints are considerably, the third joint somewhat, thicker than in the female. The abdomen proportionately somewhat longer and thicker than in the female. — Length 2.1–2.3<sup>mm</sup>.

Remarks. *L. incrimis* differs from all preceding species of this genus by having the first antennular joint shorter in proportion to its depth and to the length of second joint; in this respect it agrees with some of the following species. From *L. longircmis*, with which it agrees in having seventh joint with claw of second and third pairs of legs conspicuously shorter than sixth joint, it differs in the antennulæ, in having no ventral abdominal tubercles, shorter and stouter legs, the chela broader, etc.

Occurrence. It has been taken by the "Ingolf" at five stations.

East of Iceland: St. 58: Lat. 64° 25' N., Long. 12° 09' W., 211 fm., temp. 0.8°; 1 spec.

— - — St. 101: Lat. 66° 23' N., Long. 12° 05' W., 537 fm., temp. ÷ 0.7°; 7 spec.

North of Iceland: St. 126: Lat. 67° 19' N., Long. 15° 52' W., 293 fm., temp. ÷ 0.5°; 1 spec.

— - — St. 124: Lat. 67° 40' N., Long. 15° 40' W., 495 fm., temp. ÷ 0.6°; 1 spec.

Jan Mayen: St. 115: Lat. 70° 50' N., Long. 8° 29' W., 86 fm., temp. 0.1; ab. 75 spec.

Besides it has been secured by the II<sup>d</sup> Amdrup Exped. at a single locality.

East Greenland: Cape Dalton, Lat. 69° 24.6' N., 9–11 fm.; 1 spec. (The chelæ of this specimen has the anterior margin of the movable finger sinuate (fig. 4g)).

#### 47. *Leptognathia brachiata* n. sp.

(Pl. VII, figs. 5a–5h.)

Female. Antennulæ two-thirds as long as the carapace (figs. 5a–5b). First joint (fig. 5c) robust, somewhat longer than the three other joints combined, a little more than twice as long as thick, moderately tapering; second joint stout, a little produced above, with the upper margin somewhat longer than the depth of first joint and a little more than half as long as that joint; third joint with the upper margin a little less than half as long as that of the second; fourth joint proportionately short, considerably shorter than the second. — Antennæ with fifth joint about half as long again as the fourth, which is a little shorter than the sixth.

Chelipeds (fig. 5d) moderately robust. Carpus somewhat less than twice as long as deep, with less than the distal half much expanded downwards, the corresponding lower margin being strongly convex and almost subangular. Chela a little shorter than the carpus, a little more than twice as long as broad, without any serration; anterior margin of the hand a little longer than the movable finger, with the lower angle above the insertion of the finger scarcely rounded; movable finger of moderate breadth; fixed finger with three acute saw-teeth on the distal part of the incisive margin.

Thoracic legs rather slender. Second and third pairs subsimilar (fig. 5e); posterior spine on fourth joint as long as fifth joint, which has two long distal spines; sixth joint about half as long again as the fifth and somewhat longer than seventh with claw. Three posterior pairs (fig. 5f) with seventh joint only a little shorter than the sixth and its row of minute setiform denticles rather distinct; claw somewhat long, longer than in the preceding forms.

Five anterior abdominal segments feebly developed or scarcely distinct, the lower margin of the segments being somewhat flatly convex (fig. 5h). Pleopods with long setae. — Uropods distinctly longer than the two posterior segments combined and longer than in any other species of this genus (figs. 5g and 5h), as the peduncle is very long, almost four times as long as deep and about as long as the first joint of the endopod; second joint of the endopod slightly longer than the first joint; exopod from slightly less to slightly more than half as long as first joint of the endopod.

Length of a female with marsupium 3.3<sup>mm</sup>.

Remarks. This fine species is easily distinguished from all other forms of the genus known to me by the very long peduncles of the uropods.

Occurrence. This species has been taken by the "Ingolf" at two stations.

Davis Strait: St. 25: Lat. 63° 30' N., Long. 54° 25' W., 582 fm., temp. 3.3°; 11 spec.

— — St. 24: Lat. 63° 06' N., Long. 56° 00' W., 1199 fm., temp. 2.4°; 6 spec.

The marsupium of one of the females from Stat. 25 contains two ovisacs of an unknown species of the family Choniostomatidae. It is, I believe, the first time that the existence of a species of this family of parasitic Copepods has been observed in any form of the order Tanaidacea.

#### 48. *Leptognathia alba* n. sp.

(Pl. VII, figs. 6a—6e.)

Specimen without marsupium. The single specimen is either a female without marsupium or, judging from the thick antennulae, more probably a male so far from maturity, that the fourth antennular joint has not been divided into two joints. The body is conspicuously more robust than in the preceding forms.

Antennulae (fig. 6a) slightly more than two-thirds as long as the carapace, very robust. First joint slightly longer than the three other joints combined, not fully two and a half times as long as deep and tapering feebly; second joint thick, as long as the depth of the first and somewhat produced above; upper margin of third joint only about one-third as long as that of the second; fourth joint somewhat shorter than the second. — Antennae with fifth joint scarcely half as long again as the fourth, which is as long as the sixth.

Chelipeds (fig. 6b) moderately robust. Carpus somewhat more than twice as long as deep, with the proximal half of the upper margin somewhat concave; the distal half is feebly expanded downwards. Chela somewhat shorter than the carpus, somewhat more than twice as long as broad, oblong-triangular in aspect, without serration; the anterior distal corner of the hand not rounded; the movable finger somewhat broad and somewhat shorter than the anterior margin of the hand.

Thoracic legs somewhat slender. Second and third pairs subequal (fig. 6c); posterior spine on

fourth joint distinctly longer than fifth joint; distal spines on fifth joint uncommonly long; sixth joint not fully half as long again as the fifth; seventh joint with claw scarcely longer than fifth joint. Three posterior pairs (fig. d) with sixth joint almost as long as seventh with claw; setiform denticles on seventh joint nearly inconspicuous; claw proportionately long.

Five anterior abdominal segments with the median ventral tubercles peculiarly shaped (fig. 6e), as each tubercle, seen from the side, is somewhat low, because its lower margin is concave instead of convex. Pleopods with their marginal setae about three times as long as the rami. — Uropods a little longer than the two posterior segments combined; peduncle about half as long again as deep, only half as long as the first joint of the endopod; second joint of the endopod slightly longer than the first; exopod about half as long as the proximal joint of the endopod.

The specimen is 3.7<sup>mm</sup> long; it is quite white.

Remarks. *L. alba* is easily distinguished from all above-described species by the shape of the ventral abdominal tubercles; the shape of the joints of the chelipeds also affords good characters. The species is uncommonly robust.

Occurrence. Taken by the "Ingolf" at a single station.

South-West of Cape Farewell: St. 22: Lat. 58° 10' N., Long. 48° 25' W., 1845 fm., temp. 1.4°; 1 spec.

Group a, subdivision  $\gamma$  (vid. p. 66).

49. **Leptognathia hastata** n. sp.

(Pl. VII, figs. 7a—7g.)

Female (without marsupium). Antennulae somewhat or a little shorter than the carapace. First joint (fig. 7a) a little shorter than the three other joints combined, somewhat more than twice as long as deep and considerably tapering; second joint thick and long, a little more than half as long as the first and somewhat produced above; upper margin of third joint a little less than half as long as that of the second; fourth joint somewhat shorter than the second. — Antennae with fifth joint slightly more than half as long again as the fourth, which is as long as the sixth.

Chelipeds (fig. 7b) rather robust. Carpus only about, or even less than, half as long again as deep, with the distal part strongly expanded downwards and the corresponding lower margin very convex. Chela a little longer than the carpus, about twice as long as broad, without serration; hand with the distal anterior corner subrectangular and protruding; movable finger somewhat broad, a little shorter than the anterior margin of the hand; fixed finger with the usual teeth on the incisive margin.

Thoracic legs moderately strong. Second and third pairs subequal (fig. 7c); posterior distal spine on fourth joint a little longer than the fifth joint; sixth joint about half as long again as the fifth and its lower margin with a more or less distinct row of small denticles; seventh joint with claw slightly longer than fifth joint. Three posterior pairs (fig. 7d) have seventh joint considerably shorter than the sixth and the row of setiform denticles is very conspicuous (fig. 7e), the denticles being conspicuously longer than in the preceding forms; claw somewhat more than half as long as seventh joint.

The two anterior abdominal segments with the ventral tubercles wanting or rudimentary; third and fourth segments with the tubercles either rudimentary or rather low and triangular; fifth segment (fig. 7h) with the tubercle high and posteriorly produced into a very long, acute process projecting horizontally backwards and reaching the middle of sixth segment; in a single specimen (from Stat. 102) the tubercle of fifth segment is rudimentary with the process very short, being undeveloped from one reason or another. Pleopods with the setæ almost twice as long as the rami. — Uropods as in the majority of the preceding species, not fully as long as the two posterior segments combined; peduncle somewhat less than twice as long as deep; proximal joint of the endopod not quite as long as the peduncle and about as long as or a little longer than the distal joint (fig. 7g); exopod scarcely half as long as first joint of the endopod.

Length of the females without marsupium 2.5—2.8<sup>mm</sup>.

Remarks. The differences between *L. hastata* and the two following species are pointed out in the "Remarks" on these species.

Occurrence. *L. hastata* has been taken by the "Ingolf" at two deep-sea stations in the cold area.

East of Iceland: St. 102: Lat. 66°23' N., Long. 10°26' W., 750 fm., temp. ÷ 0.9°; 2 spec.

North of Iceland: St. 125: Lat. 68°08' N., Long. 16°02' W., 729 fm., temp. ÷ 0.8°; 1 spec.

#### 50. *Leptognathia armata* n. sp.

(Pl. VIII, figs. 1a—1f.)

Female (without marsupium) and subadult Male. This species is so closely allied to *L. hastata* that it is nearly sufficient to point out the differences. — The antennulæ of the female almost as in *L. hastata*. The antennulæ of the subadult male (fig. 1a) five-jointed, very thick; first joint a little shorter than the other joints combined, a little more than twice as long as deep, at the end somewhat less deep than somewhat beyond the base; second joint a little more than half as long as the first, somewhat more than half as long again as deep and considerably produced above; third joint short and thick; fourth and fifth joints combined somewhat shorter than the upper margin of the second, and fourth joint considerably deeper than long.

The chelipeds have the carpus two-thirds as long again as deep and its distal part is very moderately expanded downwards with the corresponding lower margin somewhat convex (fig. 1b) — thus the carpus is conspicuously longer in proportion to depth and less expanded downwards than in *L. hastata*. The chela is slightly shorter than the carpus and a little more than twice as long as broad, otherwise as in *L. hastata*.

Second and third pairs of legs (figs. 1c and 1d) nearly as in *L. hastata*, but the denticles on the posterior margin of sixth joint are very distinct, in the female specimen (fig. 1d) besides developed on fifth joint. Three posterior pairs (fig. 1c) with the setiform denticles on seventh joint scarcely as long as in *L. hastata*.

Four anterior abdominal segments (fig. 1f) with the ventral tubercles strongly chitinized, rather large and varying in shape, either subconical or a little obliquely and somewhat broadly truncate.

The process from fifth ventral tubercle is still broader at the base and longer than in *L. hastata* and besides not horizontal but directed backwards and somewhat downwards. Pleopods and uropods about as in *L. hastata*.

Length of the female without marsupium 3.8<sup>mm</sup>, of the subadult male 3.3<sup>mm</sup>.

Remarks. *L. armata* is so closely allied to *L. hastata* that I hesitated before establishing it as a separate species. But it seems to be a good deal larger than *L. hastata* and differs by having the carpus of the chelipeds less robust and conspicuously less expanded downwards, furthermore by the much more developed ventral abdominal tubercles and a different direction of the process from fifth segment. And judging from the species belonging to the subdivisions *a* and *β* of the same group a the shape of the carpus and the development of abdominal tubercles afford valuable specific characters. Finally *L. armata* was taken in very deep water with the temperatures above zero, while *L. hastata* was captured in considerable depths in the cold area. — The differences between both species and the next form, *L. Amdrupii*, are pointed out below.

Occurrence. *L. hastata* has been taken by the "Ingolf" at two stations.

Davis Strait: St. 36: Lat. 61°50' N., Long. 56°21' W., 1435 fm., temp. 1.5°; 1 spec. (♀).

South-West of Cape Farewell: St. 22: Lat. 58°10' N., Long. 48°25' W., 1845 fm., temp. 1.4°; 1 spec.  
(subad. male).

### 51. *Leptognathia Amdrupii* n. sp.

(Pl. VIII, figs. 2a—2c.)

Female. So closely allied to *L. hastata* and *L. armata* that it may be sufficient to mention some features. — The antennulæ (fig. 2a) are distinctly more slender than in those species, and the first joint is slightly more than two and a half times as long as deep, but the relative length of their joints shows no essential difference. — The chelipeds (fig. 2b) are a little less robust; the carpus is about twice as long as the depth of its distal half which, in strong contradistinction to the other species, is distinctly less deep than the proximal half and with the lower margin nearly straight; chela a little longer than the carpus and more slender than in the two species mentioned, being considerably more than twice as long as broad; the movable finger almost longer than the front margin of the hand and as broad as the fixed finger. — Second pair of legs (fig. 2c) without spinules on the posterior margin of sixth joint.

Four anterior abdominal segments with the ventral tubercles rather low; the process from fifth segment about as long as in *L. hastata* but less horizontal, though scarcely directed as much downwards as in *L. armata*. Pleopods and uropods in the main as in *L. hastata*; exopod of right uropod two-jointed and distinctly more than half as long as first joint of the endopod, while the exopod of left uropod is much shorter and one-jointed, as second joint has not been developed.

Length of the female with marsupium 2.7<sup>mm</sup>.

Remarks. By the shape of the carpus of the chelipeds *L. Amdrupii* is easily distinguished from the two preceding species. It differs on the whole a little more from *L. hastata* than from *L. armata*, but while the last-named species is only known from stations with positive temperatures at

the bottom and depths exceeding 1400 fathoms, *L. Amdrupii* was found in comparatively low water at the cold East Greenland.

The name is given in honour of G. C. Amdrup, Captain in the Danish Navy and the able leader of two Danish exploring expeditions to East Greenland.

Occurrence. Taken by the II<sup>d</sup> Amdrup Expedition at a single locality.

East Greenland: Forsblad Fjord, Lat. 72° 27' N., 90—40 fm., 1 spec. (female with marsupium).

Group b. *Uropods long, with both rami two-jointed and the exopod conspicuously shorter than the first joint of the endopod. Pleopods in the female somewhat small with the marginal setæ at most as long as the rami or almost rudimentary. Animals slender or very slender.*

#### Species 52—53.

The animals of this group are on the whole allied to those of group a, but they are more slender with the pleopods considerably or much reduced and the articulation between fourth and fifth joint of the antennæ feebly developed.

#### 52. *Leptognathia tuberculata* n. sp.

(Pl. VIII, figs. 3a—3f.)

Female. Body much more slender than in any of the preceding species, but the animal in other respects rather similar in general aspect. — Antennulæ (fig. 3a) slightly more than two-thirds as long as the carapace. First joint a little shorter than the three other joints combined, somewhat more than twice as long as deep, considerably tapering; second joint considerably produced above, distinctly more than twice as long as deep and with the upper margin conspicuously more than half as long as first joint; third joint short, fourth joint much shorter than the upper margin of the second. — Antennæ with the articulation between fourth and fifth joint feebly developed, less or more indistinct, and fifth joint about twice as long as the fourth, which is a little shorter than the sixth.

Chelipeds somewhat robust (fig. 3a). Carpus only half as long again as deep, with the distal half strongly expanded downwards and the corresponding part of the lower margin much curved and even subangular. Chela somewhat longer than the carpus and twice as long as broad, with the anterior lower corner of the hand angular; movable finger a little shorter than the anterior margin of the hand and with the subbasal part slightly narrower than the fixed finger, which has four teeth on the incisive margin.

Thoracic legs somewhat short (fig. 3a) and moderately slender. Second (fig. 3b) and third pairs with the spines on fourth and fifth joint very long; sixth joint nearly half as long again as the fifth, which is a little shorter than seventh with claw. Three posterior pairs (fig. 3c) with sixth joint as long as seventh with claw; seventh joint without any distinct row of minute setæ.

Four anterior abdominal segments (fig. 3d) with the median row of ventral tubercles low, while the tubercle on the fifth segment is more than twice as high, broadly conical, acute and even a little acuminate. Pleopods almost rudimentary, biramous, but the rami are shorter and much narrower than the small peduncle (fig. 3e), with a small terminal seta and a few minute marginal setæ. — Uropods



as in the species of group a, scarcely as long as the two posterior segments combined; peduncle twice as long as deep, distinctly more than half as long as the first joint of the endopod; the joints of the endopod subequal in length and the first joint conspicuously less than twice as long as the two-jointed exopod.

Length of a female with marsupium  $3.3^{\text{mm}}$ , of a female without marsupium  $3.1^{\text{mm}}$ .

Subadult Male. — The antennulæ five-jointed and as usually much thicker than in the female. In my single specimen the ventral tubercles on the four anterior abdominal segments are somewhat higher than in the females, while the tubercle of the fifth segment is obtuse, but probably damaged or misshaped. The pleopods are well developed (fig. 3f); as fig. e, representing a pleopod of the female, and fig. 3f, representing that of the male, were drawn with the same degree of enlargement, the comparison between these two figures will convey an idea of the enormous difference in size and development, and it may be added that the female is considerably larger than the subadult male in question. The endopod is nearly twice as long as the peduncle and has its distal rounded margin furnished with setæ as long as the ramus; the exopod is somewhat longer than the endopod, but the setæ along the terminal margin are only as long as those of the endopod. — Length of the specimen  $2.4^{\text{mm}}$ .

Remarks. *L. tuberculata* is more slender than any among the above-described species; the female is easily recognized by the nearly rudimentary pleopods and the development of the ventral abdominal tubercles. The shape of the chelipeds and the relative length of the joints of the antennulæ afford additional characters.

Occurrence. The species has been taken by the "Ingolf" at two deep-sea stations in the warm area.

Davis Strait: St. 24: Lat.  $63^{\circ}06' \text{N}$ , Long.  $56^{\circ}00' \text{W}$ , 1199 fm., temp.  $2.4^{\circ}$ ; 4 spec.

— — St. 36: Lat.  $61^{\circ}50' \text{N}$ , Long.  $56^{\circ}21' \text{W}$ , 1435 fm., temp.  $1.5^{\circ}$ ; 1 spec.

### 53. *Leptognathia uncinata* n. sp.

(Pl. VIII, figs. 4a—4i.)

Female (without marsupium). This species is closely allied to *L. dentifera* G. O. Sars, of which a co-type presented by Sars himself has been examined. The two species agree with one another in the following more important particulars. The antennulæ are characteristic (fig. 4a); first joint is considerably shorter than the three others combined, very thick, conspicuously less than twice as long as deep; second joint is uncommonly long and thick, about two-thirds as long as the first, somewhat produced above, and its upper margin a little longer than the two distal joints combined and a little more than twice as long as the depth of the joint. — Antennæ with fourth joint about half as long as the fifth, and the articulation between them feebly developed. Chela (fig. 4b) as long as the carpus, twice as long as broad, with the two setæ on the posterior margin extremely thick; the anterior distal angle above the insertion of the movable finger is protruding and even produced as a short, obtuse process. — Second pair of legs (fig. 4c) with fifth joint a little shorter than the fourth and only half as long as the sixth, which is considerably longer than seventh joint with claw

and furnished with minute denticles along the lower margin; seventh joint strongly marked off from the claw, with a distinct spinule at the end. — Ventral tubercles on the five abdominal segments very low (fig. 4d). — Uropods as long as in the *Sarsii*-group; the peduncle (fig. 4e), measured to the insertion of the rami, slightly longer than the first joint of the endopod, thick and distally above produced in a large, oblong, subacute or acute process directed somewhat backwards and gradually curved much upwards; endopod with its two joints subequal in length; the two-jointed exopod somewhat (in *L. dentifera*) or considerably (in *L. uncinata*) shorter than first joint of the endopod.

But the two species are separated by two features. In *L. dentifera* G. O. S. the carpus of the cheliped is a little less than twice as long as deep, while in *L. uncinata* it is conspicuously deeper, being only half as long again as deep (fig. 4b), the distal third being considerably expanded downwards. In *L. dentifera* the pleopods are very small, slightly longer than in *L. tuberculata* (comp. fig. 3d), in my specimen from Norway even less developed than according to Sars' fig. 2 ♂/♂, and each ramus has a single seta less than half as long as the ramus and some tiny hairs; in *L. uncinata* the pleopods (fig. 4d), though reduced in size, are much larger than in *L. dentifera* with a number of very conspicuous setae and some among them as long as the rami.

Length of the specimen 2.1 mm.

Adult Male. Antennulae seven-jointed (fig. 4f); the two proximal joints robust, together considerably longer than the other joints combined, and second joint about two-thirds as long as the first; seventh joint half as long again as the sixth; fourth, fifth and sixth joints each with a bundle of sensory filaments from the lower end. — Antennae with the articulation between fourth and fifth joint very distinct; fifth joint scarcely twice as long as the fourth, but only a little longer than the sixth.

Chelipeds somewhat robust (fig. 4f). Carpus about half as long again as deep, with the distal third distinctly expanded downwards. Chela considerably longer than the carpus, twice as long as broad, nearly triangular in aspect; distal anterior angle of the hand above the insertion of the finger protruding but a little rounded; movable finger a little shorter than the anterior margin of the hand, somewhat narrow, being scarcely half as broad as the fixed finger at the base, and its incisive margin without serration; fixed finger with half of its incisive margin finely serrate.

Second (fig. 4g) and third pairs of legs with the sixth joint only a little longer than the fifth and about as long as seventh joint with claw. Posterior pairs (fig. 4h) with seventh joint elongate, slightly longer than the sixth and about half as long again as the claw.

Sixth abdominal segment (fig. 4i) posteriorly rounded. — Uropods with the peduncle as long as second joint of the endopod, which is slightly shorter but much thinner than its first joint; the two-jointed endopod somewhat more than half as long as first joint of the endopod.

Length 1.5 mm.

Remarks. It was after considerable hesitation that I established *L. uncinata* as a new species, but the two differences pointed out between the females of *L. uncinata* and *L. dentifera* seem to be so important, that the deep-sea form ought to be established as a separate species.

I think that the reference of the adult male to this species is quite certain. This male is so small that it cannot belong to *L. armata* or *L. tuberculata* taken at the same station. Furthermore

the chelipeds of the male agree so well with those of the female in several particulars: length in proportion to depth or breadth of carpus and chela, protruding anterior angle of the hand, rather narrow movable finger and general shape of the fixed finger, and this agreement is larger than otherwise generally found in the chelipeds of the two sexes. The thickness and relative length of the two proximal joints of the antennulæ is also nearly the same in the two sexes, and perhaps the most important character is the long peduncle of the uropods in both sexes, as this joint in the male is nearly as long as, in the female slightly longer than, the first joint of the endopod, while in the females of all preceding species of the genus excepting the large *L. brachiata* the peduncle is much shorter than the first joint of the endopod.

Occurrence. Taken by the "Ingolf" at the following station.

Davis Strait: St. 36: Lat.  $61^{\circ} 50' N.$ , Long.  $56^{\circ} 21' W.$ , 1435 fm., temp.  $1.5^{\circ}$ ; 2 spec. (♀ and ♂).

It may be mentioned that the "Ingolf" at Stat. 103: Lat.  $66^{\circ} 23' N.$ , Long.  $8^{\circ} 52' W.$ , 579 fm., temp.  $\pm 0.6^{\circ}$ , captured a considerably smaller, juvenile specimen, which is at least allied to *L. uncifera* and *L. dentata*, but the process from the peduncle of the uropods is very small and subhorizontal, probably not yet developed.

Group c. *Uropods with the endopod two-jointed, the exopod well marked off, one-jointed.*

These characters pointed out are very practical. But the group comprises in reality rather heterogeneous elements, and its nine species mentioned on the following pages may be referred to three natural subdivisions.

- a. Pleopods wanting or extremely rudimentary in the females. The basal joint of the chelipeds normal, possessing a posterior process with the hind margin free and rounded. Slender species. Species 54—58.
- β. Pleopods very distinct with well developed setæ in the females. The basal joint of the chelipeds normal, as in subdivision a. Very stout species. Species 59—60.
- γ. Pleopods very distinct with well developed setæ in the females. The basal joint of the chelipeds aberrant, in a lateral view the long major part of its posterior margin is vertical and attached to the cephalothorax at or even before its middle, while the posterior process is short and situated more on the lower than on the lateral side of the cephalothorax. Species 61—62.

Group c, subdivision a (vid. above).

54. **Leptognathia manca** G. O. Sars.

(Pl. VIII, figs. 5a—5d.)

1881. *Leptognathia (?) manca* G. O. Sars, Arch. for Math. og Naturv., B. 7, p. 44.

1896. — — — Account Crust. Norway, Vol. II, p. 30, Pl. XIV, fig. 2.

Though Sars' description and figures are sufficient for the recognition of this species, I think it useful for comparison with the following forms of this subdivision to give a new description and a

couple of analytical figures of the female, together with corresponding figures of the hitherto unknown subadult male.

**Female.** The shape of the body from above is shown well by Sars' fig. 3; third to sixth thoracic segments have their lateral margins far from parallel, but conspicuously though not strongly angular, and the body tapers in breadth from the third segment.

**Antennulæ** (fig. 5a) considerably shorter than the carapace. First joint a good deal shorter than the other joints combined, about twice as long as deep, considerably tapering; second joint slightly more than half as long as the first and much produced above; upper margin of third joint distinctly less than half as long as that of the second; fourth joint about as long as the second and a little shorter than its terminal setæ. — Antennæ with fourth and fifth joint completely fused, without any vestige of an articulation between them.

**Chelipeds** (fig. 5a) somewhat slender. Basal joint not much longer than the distance between the rounded hind margin of its well developed posterior process and the front margin of second segment. Carpus almost twice as long as deep, with the lower margin feebly convex. Chela a little longer than the carpus, two and a half times, or even more, as long as broad; hand without any protruding anterior angle at the insertion of the finger, and this finger is about as long as the front margin of the hand; fixed finger slightly broader than the movable, with the teeth on the incisive margin distinct.

Second and third pairs of legs (fig. 5a) moderately strong or moderately slender; the spine on the posterior angle of fourth joint about as long as the fifth joint, which is somewhat shorter than the sixth joint, while the spines on its distal angles are long, though shorter than the joint; seventh joint with claw about as long as the sixth joint. — Three posterior pairs of legs essentially as in the *Sarsii*-group.

**Abdomen** (fig. 5b) with the lower margin of the five anterior segments conspicuously convex, but not shaped as tubercles. — Uropods moderately long, conspicuously longer than the sixth segment; peduncle a little longer than deep, conspicuously shorter than the first joint of the endopod, which is slightly shorter than second joint; the one-jointed exopod nearly as long as, or slightly longer than, the first joint of the endopod.

Length of a female with marsupium 2<sup>mm</sup>, of a female without marsupium 2.2<sup>mm</sup>.

**Subadult Male.** In the main as the female, but it differs by much thicker antennulæ and in the abdomen. The antennulæ (fig. 5c) are conspicuously longer as compared with the carapace than in the female, only four-jointed, and their three proximal joints together with the proximal part of fourth joint are much thicker than in the other sex. — The five anterior abdominal segments (fig. 5d) are longer than in the female, and the median ventral margin of each segment is shaped as a moderately high, subtriangular tubercle with the end rounded. The pleopods are somewhat long with the outer ramus much longer than the peduncle and longer than the inner ramus; the terminal setæ about as long as the rami. — Length 1.8<sup>mm</sup>.

**Remarks.** *L. manca* differs from *L. ventralis* n. sp. by a different shape of second and third antennular joints, by having no ventral process on the second thoracic segments and by the posterior margin of the basal joint of the chelipeds being rather remote from the front end of the second

thoracic segment. From *L. subæqualis* it differs in the shape of the body, which in the latter species is extremely slender with the lateral margins nearly parallel; furthermore the exopod of the uropods is proportionately conspicuously longer in *L. subæqualis* than in *L. manca*. *L. manca* is rather remote from the other forms of group c.

Occurrence. The "Ingolf" has taken this species at two localities.

Davis Strait: St. 25: Lat.  $63^{\circ}30'N$ , Long.  $54^{\circ}25'W$ , 582 fm., temp.  $3.3^{\circ}$ ; 23 spec.

South of East-Iceland: St. 90: Lat.  $63^{\circ}43'N$ , Long.  $14^{\circ}34'W$ , 90 fm., temp.  $7.0^{\circ}$ ; 1 spec.

Distribution. Sars had this species from two widely separated places on the Norwegian coast, at depths of 100—150 fathoms. It has scarcely been mentioned by any other author.

### 55. *Leptognathia subæqualis* n. sp.

(Pl. VIII, figs. 6a—6f.)

Female. Body extremely slender (fig. 6a), nine or ten times as long as broad, seen from above nearly cylindrical, with fourth and fifth thoracic segments slightly broader than the carapace or the abdomen; the lateral margins of each thoracic segment nearly parallel, not angular but a little or conspicuously rounded at both ends of each segment. — Carapace, seen from above, about half as long again as broad, twice or more than twice as long as second thoracic segment but somewhat shorter than the two anterior segments combined; the front end of the carapace conspicuously more than half as broad as the carapace somewhat behind the middle; rostral process somewhat narrow.

Antennulæ almost as long as the carapace (fig. 6b), somewhat robust. First joint nearly as long as the three other joints combined, a little or somewhat more than twice as long as deep and with the proximal third considerably thickened downwards; second joint much produced above, with the upper margin distinctly more than half as long as first joint and twice as long as the depth of the joint itself; third joint with the upper margin very short; fourth joint conspicuously shorter than the second, much shorter than some of the terminal setæ. — Antennæ with fourth and fifth joints completely fused, without any vestige of an articulation.

Chelipeds (fig. 6b and 6c) moderately strong. Basal joint long, nearly as long as the carpus, with the rounded posterior process reaching near to the front lower angle of second thoracic segment. Carpus distinctly less than twice as long as deep, with its lower margin moderately arcuate. Chela slightly or a little longer than the carpus, somewhat more than twice as long as broad; anterior distal corner of the hand not protruding, obtuse; movable finger considerably shorter than the anterior margin of the hand and much narrower than the fixed finger, which has distinct, sharp teeth on the distal half of the inner margin.

Second (fig. 6b) and third pairs of thoracic legs moderately strong; posterior spine on fourth joint and both distal spines on fifth joint long; fifth joint only as long as the fourth; sixth joint more than half as long again as fifth joint, but a little shorter than seventh joint with claw. — Three posterior pairs of legs somewhat slender; sixth joint at least somewhat shorter than seventh joint with claw, and the claw as long as or shorter than seventh joint.

Abdomen cylindrical, as long as the sum of the two posterior thoracic segments. The lower

margin of the five anterior segments (figs. 6d and 6e) a little convex. The pleopods generally wanting; in a single specimen (from Stat. 4) which seems to be a female without marsupium, I found rudimentary pleopods (fig. 6e), each pleopod being a minute, a little oval plate. — The uropods moderately long, distinctly shorter than the two posterior segments combined; the peduncle a little longer than deep, considerably or much shorter than the first joint of the endopod; the two joints of the endopod equal in length or the first a little longer than the second; the one-jointed exopod reaches considerably beyond the end of the proximal joint of the endopod, but not fully to the middle of the distal joint.

Length of specimens with or without marsupium 1.7–1.9<sup>mm</sup>.

Subadult Male. The four-jointed antennulæ (fig. 6f) considerably thicker than in the female, with first joint scarcely or distinctly less than twice as long as deep. Pleopods nearly as in *L. manca*; the outer remus is considerably or much longer than the oblong peduncle; the terminal setæ as long as or a little longer than the rami. — Length 1.4<sup>mm</sup>.

Remarks. This small and extremely slender species is easily distinguished from allied forms of this group by the shape of the body and the length of the exopod of the uropods.

As in the Norwegian species of *Leptognathia* the mandibles of *L. subaequalis* have the molar process tapering to the acute end and besides distally curved.

Occurrence. This species has been taken by the "Ingolf" at six localities.

Davis Strait: St. 32: Lat. 66° 35' N., Long. 56° 38' W., 318 fm., temp. 3.9°; 6 spec.

West Greenland: Mouth of Ameralik Fjord, near Godthaab, at Lat. 64° 11' N., 5–70 fm., shells; 16 spec.

East of Iceland: St. 4: Lat. 64° 07' N., Long. 11° 12' W., 237 fm., temp. 2.5°; 7 spec.

— - — St. 58: Lat. 64° 25' N., Long. 12° 09' W., 211 fm., temp. 0.8°; 2 spec.

North of the Færoes: St. 139: Lat. 63° 36' N., Long. 7° 30' W., 702 fm., temp. ÷ 0.6°; 35 spec.

— - - — St. 141: Lat. 63° 22' N., Long. 6° 58' W., 679 fm., temp. ÷ 0.6°; 11 spec.

This distribution is interesting, as the species has been taken both in the cold area with a temperature of ÷ 0.6° and in temperatures above zero, even + 3.9°; furthermore it occurred near land at a locality where the greatest depth was only 70 fathoms and at another station it was hauled up from 702 fathoms.

#### 56. *Leptognathia tenella* n. sp.

(Pl. IX, figs. 1a–1e.)

Female (without marsupium). Body slender, the largest specimen about eight times as long as broad (fig. 1a), seen from above nearly cylindrical, with the lateral margins of the thoracic segments slightly convex and the abdomen tapering a little from the base to the end. — Carapace much shorter than the two anterior segments combined, seen from above slightly more than half as broad at the front end as behind the middle, not much longer than broad, with the lateral margins somewhat convex and the frontal process somewhat feebly developed.

Antennulæ (fig. 1b) only a little shorter than the carapace, very characteristic. First joint as long as the three other joints combined, about two and a half times as long as deep, with the

proximal third considerably thickened downwards. Second joint much produced above, very long, having the upper margin distinctly more than half as long as that of the first joint, somewhat longer than the two distal joints combined and more than twice as long as the depth of the joint; third joint extremely short; fourth joint considerably shorter than the second which is about as long as the terminal setæ. Antennæ somewhat short; fourth and fifth joints completely fused, together conspicuously less than twice as long as sixth joint.

Chelipeds (fig. 1b) moderately robust. The basal joint is a little shorter than the carpus, its posterior process long, almost twice as long as deep with the end somewhat distant from the front lower end of second thoracic segment. Carpus a little less than twice as long as deep, with each of the two halves of the lower margin somewhat feebly convex. Chela a little longer than the carpus, a little more than twice as long as broad, presenting a somewhat peculiar aspect, because the posterior margin is conspicuously convex; no protruding angle above the insertion of the movable finger, and this finger is considerably shorter than the anterior margin of the hand and rather broad towards the base; the fixed finger has an acute tooth near the end of the incisive margin.

Second and third pairs of thoracic legs (fig. 1b) somewhat robust; fourth joint with the posterior spine rather long; fifth joint a little shorter than the fourth, with the distal anterior spine long and much longer than the posterior; sixth joint not fully twice as long as the fifth and distinctly longer than seventh joint with its claw. — Three posterior pairs of legs moderately robust (fig. 1c); the spines on fifth and sixth joints long; sixth joint somewhat shorter than seventh with its straight claw.

Abdomen as long as the two preceding segments combined; the sixth segment (figs. 1d and 1e) a little longer than the sum of the three preceding segments, thus a little longer than in the other species of this genus; this segment is somewhat produced behind, so that the uropods are inserted at, or even slightly before, the middle of its lateral margins, an arrangement producing a peculiar aspect. The lower margin of each of the five anterior segments either somewhat convex or even showing a somewhat low protuberance. — Uropods strong and considerably shorter than the sixth segment, reaching somewhat beyond the end of abdomen; peduncle much deeper than long; first joint of the endopod only half as long as the second, but yet a good deal longer than the small, one-jointed exopod.

Length of the largest specimen 1.7 mm.

Remarks. This species is easily recognized by the terminal part of the abdomen with its last segment produced posteriorly and the characteristic uropods originating at the middle of the lateral margins of the segments; the shape of the body, the antennulæ, the chelipeds afford further characters. — Mouth-parts unknown.

Occurrence. It has been taken by the "Ingolf" at a single station.

Davis Strait: St. 24: Lat. 63°06' N., Long. 56°00' W., 1199 fm., temp. 2.4°; 3 spec.

### 57. *Leptognathia ventralis* n. sp.

(Pl. VIII, figs. 7a—7k.)

Female. Body slender (fig. 7a), about seven times as long as broad, decreasing somewhat in breadth from the carapace to the end of abdomen. — Carapace as long as, or even slightly longer

than, the two following segments combined, considerably longer than broad, anteriorly a little more than half as broad as behind the middle, with the frontal process small and the posterior two-thirds of the lateral margins rather convex.

Antennulæ (fig. 7 b) considerably shorter than the carapace, moderately slender; first joint somewhat shorter than the three other joints combined, a little more than twice as long as deep, with the proximal third somewhat thickened downwards; second joint distinctly more than half as long as the first, not much produced above and about twice as long as deep; third joint as long above as below and slightly more than half as long as the second; fourth joint a little shorter than second, somewhat shorter than a couple of the terminal setæ. — Antennæ with fourth and fifth joints completely fused, together about three times as long as sixth joint.

Chelipeds (fig. 7 b) moderately strong. The basal joint considerably shorter than the carpus; its posterior process deeper than long, and its free hind margin reaches almost or fully to the anterior lower end of the second segment. Carpus somewhat long, about twice as long as deep, with the lower margin somewhat convex. Chela slightly or somewhat longer than the carpus, somewhat more than two and a half times as long as broad; no protruding angle above the movable finger, which is slightly shorter than the anterior margin of the hand and moderately broad; fixed finger with a tooth near the end.

Thoracic segments, seen from above (fig. 7 a) somewhat peculiar. Second segment short, very much shorter than the third and decreasing much in breadth backwards. Third to sixth segments each with the antero-lateral angles somewhat protruding and rounded, the lateral margin with the anterior half distinctly concave, at or behind the middle a little protruding and then converging much to the front margin of the next segment; seventh segment in the main of the same shape, but the convex part of the lateral margin is situated more backwards and is more protruding. Anterior ventral part of second segment produced in a conical, oblique process directed forwards and downwards, generally large and acute (as in the subadult male, fig. 7 i), but in a couple of females (one of which with marsupium) the process is smaller with the end obtuse (fig. 7 b). — Thoracic legs somewhat slender and long. Second and third pairs with rather long or long distal spines on fourth and fifth joint (figs. 7 b, 7 e and 7 h); sixth joint varies in length, being from a little shorter (fig. 7 h) to somewhat or considerably longer than fifth joint (figs. 7 b and 7 e), but it is always somewhat shorter than seventh joint with claw. Three posterior pairs (fig. 7 f) with the spines on fifth and sixth joint long and sixth joint shorter than seventh with claw.

Abdomen as long as the two preceding segments combined. Five anterior segments with their lower margin rather convex (fig. 7 g); pleopods entirely wanting. Sixth segment not quite as long as the three preceding segments combined, seen from above (fig. 7 a) with the portion between the uropods broadly triangular, acute. — Uropods slender and somewhat long, longer than the two posterior segments combined (fig. 7 g); peduncle much longer than deep, but considerably shorter than the proximal joint of the endopod; endopod with second joint distinctly longer than the first; the exopod thin and more than half as long as the first joint of the endopod but always somewhat shorter than that joint.

Length of females with or without marsupium 2—2.1 mm.



Subadult Male. The antennulæ (fig. 7 i) much thicker than in the female, nearly as long as the carapace; first joint twice as long as deep; fourth joint conspicuously longer than in the female and distinctly longer than second. Pleopods long, about as long as the last segment (fig. 7 k) and especially the exopod is long in proportion to the peduncle, but the terminal setæ are only about half as long as the exopod. — Length 1.5–1.7 mm.

Remarks. *L. ventralis* is somewhat allied to *L. manca* and *L. subæqualis* but easily separated by the shape of the thoracic segments, by the uropods and by the ventral process on second thoracic segment.

The mandibles of *L. ventralis* (fig. 7 c) differ materially in the shape of the molar processes from those in the species figured by Sars. The molar process of left mandible (*l*) is subcylindrical, its end cut off obliquely and furnished with about six triangular, obtuse teeth along the major part of the terminal margin and some four slender teeth at the posterior part of that margin; the molar process of the right mandible has in the main the same shape, but its oblique end has few and feeble teeth and besides a single spine.

Occurrence. It has been taken by the "Ingolf" at four stations.

South of the Davis Strait: St. 38: Lat. 59° 12' N., Long. 51° 05' W., 1870 fm., temp. 1.3°; 1 spec.

South of Iceland: St. 64: Lat. 62° 06' N., Long. 19° 00' W., 1041 fm., temp. 3.1°; 1 spec.

East of Iceland: St. 101: Lat. 66° 23' N., Long. 12° 05' W., 537 fm., temp. ÷ 0.7°; 1 spec.

Jan Mayen: St. 115: Lat. 70° 50' N., Long. 8° 29' W., 86 fm., temp. 0.1°; 22 spec.

This occurrence is somewhat astonishing. It is seen that the depths of the four stations vary from 86 to 1870 fathoms, the temperatures of the bottom from 3.1° to ÷ 0.7°. In vain I have attempted to find any valuable difference between the specimens from these stations. In the specimen from Stat. 38 (1870 fm.) the sixth joint of second and third pairs of legs is a little shorter as compared with fifth joint, the spines on fourth to sixth joint are longer and the uropods slightly longer than in the specimens from Stat. 115, but these differences seem to me to be insufficient as specific characters.

## 58. *Leptognathia acanthifera* n. sp.

(Pl. IX, figs. 2a–d).

Female (without marsupium). Somewhat slender (fig. 2a) a little less than seven times as long as broad, but decreasing considerably in breadth from second thoracic segment to the end of abdomen. — Carapace almost as long as the two following segments combined, anteriorly a little more than half as broad as behind the middle and with the posterior two-thirds of the lateral margins rather convex.

Antennulæ (fig. 2b) somewhat short, considerably or much shorter than the carapace, somewhat robust. First joint almost as long as the three other joints combined, nearly half as deep as long; second joint scarcely half as long as the first, not much produced above; third joint distinctly longer than deep, with the upper margin a little more than half as long as that of second joint; fourth joint somewhat shorter than the second and somewhat shorter than its terminal setæ. — Antennæ without any vestige of an articulation between fourth and fifth joint.

Chelipeds (fig. 2b) moderately strong. The basal joint somewhat large, a little shorter than the carpus, with the posterior protuberance well developed and the free rounded hind margin a little in advance of the front lower end of second thoracic segment. Carpus a little more than twice as long as deep, with its lower margin rather feebly curved. Chela somewhat longer than the carpus, almost two and a half times as long as broad; movable finger somewhat robust, as long as the anterior margin of the hand.

Thoracic segments, seen from above (fig. 2a), with the lateral margins somewhat angular; on second to fourth segment the angles are situated before the middle and more or less rounded, on fifth and sixth segment the angles are respectively a little and somewhat behind the middle and moderately sharp, while on seventh segment no angle but a rounded protuberance is seen on each side near the posterior margin. Second segment somewhat or considerably shorter than the third, without any ventral process, but second, third and fourth segments have their lateral margins behind the insertion of each leg produced in a somewhat broad, oblong, acute process (fig. 2b) directed downwards and distally curved forwards; the processes on second segment are somewhat large and larger than those on the two other segments; the processes are not visible when the animal is seen from above. — Thoracic legs (figs. 2b and 2c) somewhat long and slender, with sixth joint distinctly shorter than seventh with claw. Second and third pairs (fig. 2b) subequal; posterior spine of fourth joint rather long; fifth joint about as long as the fourth, with its two distal spines of very moderate length.

Abdomen as long as seventh, sixth and half of fifth segment combined, decreasing distinctly in breadth backwards; sixth segment shorter than the three preceding segments combined but only a little shorter than broad, broadest at the middle, and with the proximal part of the lateral margins somewhat concave. Ventral margin of the five anterior segments somewhat convex (fig. 2d); no pleopods. — Uropods (fig. 2d) slender, about as long as the sum of the two posterior segments; peduncle a little longer than deep; endopod with second joint distinctly longer than the first; exopod slightly more than half as long as first joint of the endopod.

Length of the largest specimen 1.7 mm.

Remarks. *L. acanthifera* is easily separated from all other species by the lateral processes of second to fourth segment; furthermore the antennulae are somewhat short and the uropods characteristic.

Occurrence. Taken by the "Ingolf" at a single deep-sea station.

Davis Strait: St. 36: Lat. 61° 59' N., Long. 50° 21' W., 1435 fm., temp. 1.5°; 3 spec.

Group c, subdivision  $\beta$  (vid. p. 85).

59. **Leptognathia breviremis** Lilljeborg.

Pl. IX, figs. 3a—3g.

1864. *Tanais breviremis* Lilljeborg, Bidrag til kännedomen om de inom Sverige och Norrige förekommande Crust. af .... Tanaidernas familj, p. 21 (Female).

1896. *Leptognathia breviremis* G. O. Sars, Account Crust. Norway, Vol. II, p. 28, Pl. XIII, fig. 1.

Female. Though Sars has published a good description with figures of this form, it may be useful to point out a number of features.

The antennulæ (fig. 3 a) are moderately stout and considerably shorter than the carapace. First joint nearly as long as the other joints combined, scarcely or distinctly more than twice as long as deep; second joint nearly half as long as the first and considerably produced above; third joint with its upper margin very short; fourth joint a little shorter than second, with its terminal setæ somewhat long. — Antennulæ with the articulation between fourth and fifth joint indistinct or moderately distinct.

Chelipeds somewhat long and moderately slender (fig. 3 a). Basal joint normal, somewhat long but yet somewhat shorter than the carpus, and the posterior margin of the protuberance reaches about the front angle of second thoracic segment. Carpus slightly or scarcely more than twice as long as deep, with its lower margin almost straight. Chela scarcely as long as the carpus, somewhat more than twice as long as broad; hand uncommonly long, with the anterior margin almost half as long again as the movable finger and with only a single seta at the hind margin at the base of the fixed finger, which has at least the distal tooth of the incisive margin triangular and well developed.

Thoracic legs moderately slender; sixth joint about as long as or, especially in the posterior pairs, a little longer than seventh with claw. Second (fig. 3 a) and third pairs have the fifth joint at least not longer than the fourth but much shorter than the sixth, and the setæ of moderate length.

Abdomen (figs. 3 b and 3 c) has the ventral margin serrate, as each of the five anterior segments has a well developed, oblique, triangular or distally obliquely cut, conspicuous process. Sixth segment not fully as long as the sum of the three preceding segments. Pleopods somewhat short and broad, with the setæ well developed and some of these longer than the rami. — Uropods short, in smaller specimens somewhat, in large specimens considerably or much, shorter than the last segment; endopod with first joint conspicuously shorter than, or about as long as, the second; exopod a little or somewhat shorter than the endopod.

Length of one of the largest specimens without marsupium (from the "Ingolf" Stat. 38) 1.8 mm, of an ovigerous female (from Stat. 117) 1.4 mm, of an ovigerous female from Norway 1.3 mm.

Subadult Male. Antennulæ as usually considerably thicker and the pleopods somewhat longer than in the female.

Adult Male (figs. 3 d—3 g). Antennulæ 7-jointed; the two proximal joints very thick and the upper margin of first joint about half as long again as that of the second; third and fifth joints quite short, fourth joint extremely short, these three joints taken together not quite as long as the second; fourth and fifth joints each adorned with very long sensory filaments; sixth joint either conspicuously longer than, or only as long as, the three preceding joints combined, at the lower distal angle with a bundle of shorter sensory setæ, and either a little longer or even a little shorter than seventh joint, which terminates in two strong setæ and a sensory hair. — Antennæ only as long as the upper margin of the two proximal antennular joints, terminating in an extremely long seta.

Chelipeds (fig. 3) long and moderately slender; carpus twice as long as deep. Chela considerably longer than the carpus, somewhat less than three times as long as broad; hand elongate, with the anterior margin half as long again as the movable finger, which is slender, while the fixed finger is broad at the base and its incisive margin extremely finely serrate, a feature visible only under high magnifying power.

Thoracic segments as usually short, together even less than twice as long as the carapace. Seventh segment with a large, obliquely triangular ventral process. — Thoracic legs long and slender; second (fig. 3d) and third pairs with the sixth joint almost half as long again as the fifth and scarcely longer than seventh with claw. Fifth pair with seventh joint plus claw considerably longer than sixth joint, while in the two posterior pairs (fig. 3e) the difference in length between the same parts is somewhat small.

Abdomen (fig. 3f) extremely long, about twice as long as the six thoracic segments combined; the five anterior segments each with an obliquely triangular ventral process, which is large on first segment, and the processes decrease gradually in size from first to fifth segment, so that that of the last-named segment is quite low. Pleopods long with extremely long setae. Sixth segment about as long as the two preceding segments combined, posteriorly produced in a triangular, acute process. — Uropods inserted before the middle of their segment and reaching somewhat beyond its end; endopod three-jointed and last joint a little (fig. 3g) or somewhat (fig. 3f) shorter than the two others combined; exopod one-jointed, very slender, slightly longer than the first joint of the endopod.

Length 1—1.1 mm.

Remarks. The female and subadult male of *L. breviceimis* are easily distinguished from all other species of the genus excepting *L. crassa* n. sp. by the thick body, the short uropods, etc. By the rather slender carpus and the slender chela with its proportionately long hand it can be separated from *L. crassa*. The adult male was hitherto unknown.

Occurrence. This species has been taken by the "Ingolf" at fifteen stations.

Davis Strait: St. 24: Lat. 63°06' N., Long. 56°00' W., 1199 fm., temp. 2.4°; 2 spec.

— — St. 36: Lat. 61°50' N., Long. 56°21' W., 1435 fm., temp. 1.5°; 20 spec,  
2 of which are adult males.

South of Davis Strait: St. 38: Lat. 59°12' N., Long. 51°05' W., 1870 fm., temp. 1.3°; 6 spec.

South of Iceland: St. 64: Lat. 62°06' N., Long. 19°00' W., 1041 fm., temp. 3.1°; 1 spec.

North of the Færoes: St. 141: Lat. 63°22' N., Long. 6°58' W., 679 fm., temp. ÷ 0.6°;  
large number of specimens.

— - - — St. 139: Lat. 63°36' N., Long. 7°30' W., 702 fm., temp. ÷ 0.6°;  
large number of specimens.

East of Iceland: St. 105: Lat. 65°34' N., Long. 7°31' W., 762 fm., temp. ÷ 0.8°; 4 spec.

— - — St. 103: Lat. 66°23' N., Long. 8°52' W., 579 fm., temp. ÷ 0.6°; 1 spec.

— - — St. 102: Lat. 66°23' N., Long. 10°26' W., 750 fm., temp. ÷ 0.9°; ab. 30 spec.

— - — St. 101: Lat. 66°23' N., Long. 12°05' W., 537 fm., temp. ÷ 0.7°; 8 spec.,  
one of which is an adult male.

North of Iceland: St. 125: Lat. 68°08' N., Long. 16°02' W., 729 fm., temp. ÷ 0.8°; 8 spec.

North-East of Iceland: St. 120: Lat. 67°29' N., Long. 11°32' W., 885 fm., temp. ÷ 1.0°; 6 spec.

— - — St. 119: Lat. 67°53' N., Long. 10°19' W., 1010 fm., temp. ÷ 1.0°; 33 spec.

South of Jan Mayen: St. 118: Lat. 68°27' N., Long. 8°20' W., 1060 fm., temp. ÷ 1.0°; 1 spec.

— - - — St. 117: Lat. 69°13' N., Long. 8°23' W., 1003 fm., temp. ÷ 1.0°;  
large number of specimens.

**Distribution.** Lilljeborg established *L. breviremis* on specimens taken at Bohuslän, 50–60 fathoms, and at Molde (the western coast of Norway, at Lat. 62° 45' N.), 40–50 fathoms. Sars possessed it from Christiania Fjord, 20–60 fathoms, and from several places on the South and West coasts of Norway, northwards to Kvalø, at Lat. 70° 40' N. In 1910 I mentioned it from two places in the Kattegat, 15 and 17 fathoms and from a place in Skager Rak, 125 fathoms. Besides the species has been taken between Norway and the Orkneys, 150 fathoms (Internat. Investig.), at some places on both sides of Scotland, f. inst. near Aberdeen, 45 fathoms, and in Loch Fyne pelagically in a vertical haul (T. Scott), furthermore off Northumberland (G. S. Brady), at Plymouth (A. M. Norman) and off West Ireland, 320 fathoms (Tattersall).

The perusal of the preceding lines and of the "Ingolf" stations shows the bathymetrical occurrence to be extremely remarkable. In vain I have attempted to find any difference worth mentioning between females from 1870 fathoms in the warm area, from 1003 fathoms in the cold area and Norwegian specimens from 20–60 fathoms presented by Sars. To begin with I had believed that the specimens from the "Ingolf" belonged to a species different from the *L. breviremis* occurring at Denmark and Norway, but after a detailed examination I was forced to abandon that opinion, as I could not find any other difference than that the uropods seem to be a little longer and sixth abdominal segment a little less highly vaulted in the Norwegian specimens (fig. 3c) than in specimens from the deepest "Ingolf" stations.

60. **Leptognathia crassa** n. sp.

(Pl. IX, figs. 4a–4e.)

**Female** (without marsupium). Body uncommonly robust (fig. 4a), from four and a half to slightly more than five times as long as broad, seen from above subcylindrical, with the abdomen slightly narrower than the thorax and the lateral margins of the thoracic segments slightly convex. — Carapace a little shorter than the two following segments combined (fig. 4a), slightly broader than long and at the anterior end about half as broad as a little from the base; frontal process feebly developed, short, broad, acute.

Antennulæ (fig. 4b) only a little shorter than the carapace. First joint a little shorter than the other joints combined, robust, not fully twice as long as deep and somewhat produced above; second joint thick, distally much produced above, with the upper margin as long as the depth of the first joint; third joint with the upper margin very short; fourth joint slightly shorter than the upper margin of the second, slender and subcylindrical, with the terminal setæ somewhat long. — Antennæ with fourth and fifth joints completely fused, and this fourth joint only half as long again as the penultimate joint.

Chelipeds robust (fig. 4b). Basal joint thick, with the free hind margin of the posterior protuberance reaching to second thoracic segment. Carpus somewhat longer than the basal joint, ovate, somewhat or considerably less than twice as long as deep, with the free lower margin distinctly, the upper margin strongly convex. Chela slightly longer than the carpus, somewhat more than twice as long as broad; the hand with two strong setæ on the posterior margin at the base of the movable finger and its anterior margin only a little longer than the movable finger.

Thoracic segments subrectangular (fig. 4a) with their lateral margins slightly convex; third segment conspicuously less than half as long again as the second. — Legs of middle length (figs. 4b and 4c), and seventh joint with claw a little longer than sixth joint. Second and third pairs with sixth joint about as long as fifth plus half of the fourth and the setæ somewhat short; three posterior pairs (fig. 4c) with some of the setæ rather long.

Abdomen deep (fig. 4d) and as long as the sum of the three posterior thoracic segments; the ventral serration is low and feebly developed, but the margin of each segment shows a sharp angle. Pleopods small, but both rami with some well developed setæ about as long as the rami (fig. 4e). Sixth segment, seen from above (fig. 4a), as long as the sum of the three preceding segments and posteriorly broadly rounded. — Uropods (figs. 4d and 4e) only about half as long as their segment; peduncle deep; endopod with first joint almost as deep as long, thicker and much shorter than second joint and as long as, or slightly shorter than, the thin exopod.

Length of the largest specimen, a female without marsupium, 1.9<sup>mm</sup>.

Remarks. *L. crassa* is similar to *L. breviviremis*, but differs in several particulars. The antennulæ have the two proximal joints conspicuously thicker, but the fourth joint slender and cylindrical instead of conical. The chelipeds are much more robust with the carpus considerably deeper, the hand shorter in proportion to the movable finger than in *L. breviviremis* and two strong setæ instead of one at the posterior base of the fixed finger. The abdomen has the ventral serration much less developed and the pleopods and uropods are distinctly smaller than in the other species.

Occurrence. Taken by the "Ingolf" at its deepest station.

South of Davis Strait: St. 38: Lat. 59° 12' N., Long. 51° 05' W., 1870 fm., temp. 1.3°; 6 spec.

It may be added that after I had discovered the six specimens of this species between the specimens of *L. breviviremis* from the same station, I looked in vain for more specimens among the numerous specimens of the last-named species from the other fourteen "Ingolf" stations.

#### Group c, subdivision $\gamma$ (Vid. p. 85).

##### 61. *Leptognathia polita* n. sp.

(Pl. IX, figs. 5a–5f.)

Female (without marsupium). Moderately robust (fig. 5a), about six and a half times as long as broad and seen from above subcylindrical, yet with the carapace and the middle of abdomen slightly broader than the thoracic segments, which have their lateral margins almost straight, being curved only at both ends of each segment. — Carapace slightly longer than the sum of the two next segments, seen from above (fig. 5a) nearly hexagonal and broadest considerably before the middle, where each lateral margin has a pronounced angle, and from these angles the margins converge slightly to the base and strongly to the front end, which is conspicuously less than half as broad as the carapace between the angles mentioned; frontal process low, rounded.

Antennulæ (fig. 5b) much shorter than the carapace and rather slender. First joint almost as long as the other joints combined, two and a half times as long as deep; second joint considerably produced above, half as long as the first and above a little more than twice as long as deep; third

joint with the upper margin half as long as that of second joint and conspicuously longer than the depth of the joint; fourth joint considerably shorter than the second and its longest terminal seta longer than the two distal joints combined. — Antennæ only a little shorter than the antennulæ, with fourth and fifth joints well separated.

Chelipeds (figs. 5b and 5c) strong and very curious. Basal joint nearly deeper than long; the posterior protuberance is, seen from the side, small, about as long as deep and with only the lower margin free, while even the posterior end is situated somewhat before the middle of the cephalothorax; the area between the hind margin of the basal joint and the thinner integument behind the cephalothorax is large, oblong, more than twice as long as deep and well separated by a thin-skinned, horizontal ridge from the carapace. The carpus, though a good deal longer than the basal joint with posterior protuberance, is short and deep, being less than half as long again as deep, with the upper margin very convex and the lower peculiarly hollowed. Chela somewhat longer than carpus and twice as long as broad; anterior margin of the hand distinctly shorter than the movable finger, which is very thick towards the base (fig. 5c) with its incisive margin very sinuate, having a broad, oblong-triangular protuberance before the middle; fixed finger with two tubercles on the incisive margin, the proximal being somewhat small though very distinct, the distal large, much broader than high, rounded; two setæ on the posterior margin of the hand, and the end of both fingers obtuse.

Second thoracic segment somewhat shorter than the third (fig. 5a); all segments transverse and all, excepting the seventh, subquadrangular with the angles rounded. — Thoracic legs uncommonly short. Second (fig. 5d) and third pairs moderately slender; distal spines on fourth and fifth joints moderately long; sixth joint somewhat longer than the fifth and a little longer than seventh with claw; the claw a little more than half as long as seventh joint.

Abdomen somewhat shorter than the three preceding segments combined (fig. 5a). Five anterior segments each with a rounded, moderately large ventral protuberance; pleopods moderately small and their rami with somewhat long setæ (fig. 5f). Sixth segment about as long as the three preceding segments combined. — Uropods a little shorter than their segment, somewhat robust; peduncle longer than deep; first joint of the endopod a little longer than the second and somewhat longer than the one-jointed exopod.

The body of the animal is polished, shining, yellowish, and the fingers of the chelæ are deep reddish yellow.

Length of the single probably full-grown specimen 3.2<sup>mm</sup>.

Remarks. This species is moderately large and easily distinguished from all other forms of the genus excepting *L. vicina* n. sp. by its shape, colour, uropods, etc., but especially by the peculiar development of the chelipeds, which originate before the middle of the cephalothorax. The differences between *L. polita* and *L. vicina* are pointed out in the "Remarks" on the latter species.

Occurrence. This species has been taken by the "Ingolf" at a single station.

North of the Færoes: St. 141: Lat. 63° 22' N., Long. 6° 58' W., 679 fm., temp. ÷ 0.6°; 1 probably full-grown specimen and 1 juvenile specimen without seventh pair of legs.

62. *Leptognathia vicina* n. sp.

(Pl. IX, figs. 6a—6i.)

Female. Moderately robust (fig. 6a), from six to seven times as long as broad and seen from above subcylindrical, yet with the carapace and the middle of abdomen from slightly to distinctly broader than the thoracic segments. — Carapace nearly as long as, or slightly longer than, the two following segments combined (fig. 6a), seen from above less or more distinctly hexagonal and sub-similar to that of *L. polita*, but the broadest place is only a little before the middle; frontal process small, acute.

Antennulæ (fig. 6b) much shorter than the carapace and moderately slender. First joint somewhat shorter than the three other joints combined, a little more than twice as long as deep; second joint distally moderately produced above, with its upper margin half as long as the first joint but not quite twice as long as the depth; third joint above slightly more than half as long as the second; fourth joint a little shorter than the second and not much shorter than its terminal setæ. — Antennæ as long as the three proximal antennular joints combined, with fourth and fifth joints well separated and fifth joint half as long again as the fourth, which is slightly longer than the sixth.

Chelipeds (figs. 6b and 6f) somewhat similar to those in *L. polita*, but yet showing some differences. Basal joint about as long as deep, with the posterior protuberance, seen attached to the animal and from the side, not only somewhat short but low — when the cheliped has been removed and pressed a little under a glass-cover that protuberance shows itself to be a good deal broader (fig. 6f) because its lower part, which on the animal turns downward, then becomes visible. The area between the basal joint and the thin integument behind the cephalothorax is large, a little more than twice as long as deep, but the hind margin of the posterior protuberance is yet situated a little behind the middle of the cephalothorax. Carpus much longer than the basal joint, conspicuously less than half as long again as deep, and its lower margin has a conspicuous protuberance bearing two setæ. Chela as long as the upper margin of carpus plus the basal joint and a little more than twice as long as broad; anterior margin of the hand a little longer than the movable finger, which is very thick towards the base, but its incisive margin has its proximal half a little concave and without any protuberance before the middle; the fixed finger has on the incisive margin a feeble proximal and a more oblong and conspicuous though rather low distal protuberance.

Thoracic segments (fig. 6a) transverse with their lateral margins a little convex or rather sub-angular and as usually in such cases second to fourth segments are broadest before the middle, the other segments broadest gradually more and more behind the middle. Second thoracic segment somewhat or considerably shorter than the third. — Thoracic legs of moderate length; second (fig. 6b) and third pairs in the main as in *L. polita*, but seventh joint with claw as long as or a little longer than sixth joint. Three posterior pairs (fig. 6g) in the main as in *L. polita*, but sixth joint almost longer than the seventh joint with its somewhat short claw.

Abdomen somewhat shorter than the three preceding segments combined (fig. 6a). Ventral side of the five anterior segments (fig. 6h) with rounded moderate protuberances; the moderately small pleopods and their setæ also nearly as in *L. polita*. Sixth segment somewhat shorter than the sum



of the three preceding segments. — Uropods (fig. 6h) a little longer than sixth segment, somewhat robust; peduncle thick, only a little longer than deep; endopod with first joint a little longer than the second and considerably longer than the exopod.

The animals are whitish or light yellowish and less shining than in *L. polita*.

Length of females with marsupium 2.7—3 mm., of a very large female without marsupium 3.3 mm.

Subadult Male. The antennulæ (fig. 6i) are considerably thicker than in the female; first joint only slightly longer than second and third joints combined, about twice as long as deep; second joint only a little less deep than the proximal part of the first joint and conspicuously less than half as long again as deep. — Abdomen longer than in the female, slightly longer than the three preceding segments combined. Pleopods larger and especially the exopods conspicuously longer with longer setæ than in the females. — Length 2.4—3.0 mm.

Remarks. *L. vicina* is allied only to *L. polita*; the best distinguishing characters between them are afforded by the joints of the chelipeds and by the much feebler armature of the incisive margins of the fingers of the chelæ in *L. vicina*.

The mouth-parts have been examined. The mandibles (fig. 6c) are slender and their molar processes are very different from those in the species of *Leptognathia* figured by Sars. Each molar process has the proximal half somewhat thicker than the distal; the end is rounded with three triangular teeth in front (fig. 6d) and posteriorly with several slender processes forming a comb. The maxillulæ (fig. 6e) are very slender, but the major part of the palp is somewhat inflated.

Occurrence. *L. vicina* has been taken by the "Ingolf" at two stations.

Davis Strait: St. 32: Lat. 66° 35' N., Long. 56° 38' W., 318 fm., temp. 3.9°; 1 spec.

— — St. 28: Lat. 65° 14' N., Long. 55° 42' W., 420 fm., temp. 3.5°; 40 spec.

Besides it has been taken by Admiral C. Wandel in 1889 at the following place.

Davis Strait: Lat. 66° 49' N., Long. 56° 28' W., 235 fm., sand and ooze, temp. 4.4°; 1 spec.

Group d. *Uropods with the peduncle produced in a triangular protuberance probably answering to an exopod not marked off, endopod two-or one-jointed. Pleopods moderately well developed.*

Species 63—65.

This group is a very natural one, as its three species are allied to each other and differ in several features from all species of this genus described in the preceding pages. The chelipeds differ from those of all other species by the curiously shaped ischium and carpus; furthermore the basal joint has the whole oblique posterior margin attached to the cephalothorax. The three posterior pairs of legs are robust with seventh joint short and the claw very short.

### 63. *Leptognathia profunda* n. sp.

(Pl. X, figs. 1a—1h).

Female (without marsupium). Body slender, a little more than eight times as long as broad (fig. 1a) and with the abdomen almost broader than the thorax or the carapace. Carapace as long as the two following segments combined (fig. 1a), seen from above considerably longer than broad, feebly angular before the middle and in front more than half as broad as near the middle.

Antennulæ scarcely or a little shorter than the carapace (fig. 1b), moderately robust. First joint only a little longer than second and third joints combined, about twice as long as deep; second joint a little more than half as long as the first and a little produced above; third joint moderately long, with its lower margin as long as that of second joint; fourth joint almost as long as the second. — Antennæ with fourth and fifth joints completely fused.

Chelipeds (figs. 1b and 1c) moderately strong. Basal joint short, with its entire posterior margin very oblique and attached to the lower part of the side of cephalothorax nearly at its middle, thus very far from the lower front angle of second thoracic segment. Carpus half as long again as deep, somewhat triangular in aspect, with its postero-inferior margin long; the anterior margin uncommonly short. Chela not longer than the carpus, somewhat curved, almost two and a half times as long as broad with the posterior margin of the hand considerably concave; movable finger as long as the anterior margin of the hand, moderately broad; fixed finger with its posterior margin straight and with a single seta towards its base; this finger is somewhat broader than the movable and decreases gradually in breadth from the base to somewhat from the end, where a conspicuous, triangular tooth projects on the incisive margin, while the distal portion of the finger beyond that tooth is slender, straight and projects conspicuously when the fingers are closed; the movable finger has a long and strong sub-spiniiform seta projecting from the inner side somewhat from the base; furthermore a long seta and two shorter setæ originate from the inner surface of the hand at the base of the fixed finger; when the fingers are closed no interval is found between their proximal halves.

Thoracic segments with their lateral margins considerably convex (fig. 1a); second segment somewhat shorter than the third. — Second to fourth pairs of thoracic legs (fig. 1b) moderately strong, subsimilar in shape but decreasing considerably in length from second to fourth pairs; second pair (fig. 1d) with fourth and fifth joints subequal in length and their terminal setæ short; sixth joint somewhat longer than the fifth and as long as seventh joint with claw. Three posterior pairs (fig. 1e) somewhat short and robust with their spines rather short; seventh joint short and the claw very short; both together much shorter than sixth joint.

Abdomen somewhat longer than the two preceding segments combined (fig. 1a). Ventral margin of each of the five anterior segments somewhat convex. Pleopods somewhat large (fig. 1g); both rami with a good number of plumose setæ (fig. 1f) and many of them long; the setæ are found on the exopod along the whole, on the endopod along the distal half, of the outer margin. Sixth segment as long as the two preceding segments combined. — Uropods somewhat shorter than sixth segment; peduncle broad but distinctly longer than deep, with its lower produced part almost as long as the upper margin of the peduncle and terminating in a long seta and two short setæ (fig. 1h); the endopod moderately robust, two-jointed, but the articulation is not very distinct; the second joint scarcely as long as the first and with a dorsal seta at the middle.

Length 2.2 mm.

Remarks. *L. profunda* differs from all preceding species of the genus by the characters enumerated for the group. Its differences from *L. latiremis* n. sp. are pointed out in the "Remarks" on this species.

Occurrence. It has been taken by the "Ingolf" at a single deep-sea station.

South-West of Cape Farewell: St. 22: Lat. 58° 10' N., Long. 48° 25' W., 1845 fm., temp. 1.4°; 3 spec.

64. *Leptognathia latiremis* n. sp.

(Pl. X, figs. 2a—2n).

Female (without marsupium) and subadult Male. Somewhat slender, about seven and a half times as long as broad, seen from above subcylindrical, but the lateral margins of the thoracic segments considerably convex. — Carapace somewhat shorter than the two following segments combined (fig. 2a), not much longer than broad, subquadrangular but with all angles broadly rounded.

Antennulæ in the female only a little shorter than the carapace, somewhat varying in thickness (figs. 2b and 2c). First joint somewhat longer than the two following joints combined, about two and a half times as long as deep; second joint about half as long as the first and a little produced above; third joint considerably shorter than the second, while fourth joint is conspicuously longer than the second; in a subadult male the three proximal joints (fig. 2d) are considerably thicker in proportion to length and the fourth joint is much longer than the second and only a little shorter than the first. — Antennæ with fourth and fifth joints completely fused, about twice as long as the penultimate joint.

Chelipeds robust (fig. 2g). The basal joint as in *L. profunda*; ischium extremely broad, embracing more than half of the lower margin of the carpus. Carpus extremely deep, less than half as long again as deep. Chela a little longer than the carpus, twice as long as broad; the proximal third of the posterior margin very concave and the major part distinctly convex, with two setæ; the fixed finger is peculiarly shaped, the incisive margin to a little from the end being very convex and a little more than the distal half of this portion serrate with some more or less obtuse teeth; the terminal small part of the finger is shaped as an oblong, almost straight tooth; the movable finger is robust, but yet very conspicuously narrower than the proximal half of the fixed finger and considerably shorter than the anterior margin of the hand; when the fingers are closed a conspicuous strip of the movable finger is covered by the fixed finger, while at the base there may be seen a minute hole between the fingers; the inner side of the hand bears a long, spiniform seta and a similar seta originates from the inner surface of the movable finger.

Thoracic segments nearly as in *L. profunda*. All thoracic legs (figs. 2h—2k) in the main as in *L. profunda*, but in the anterior pairs fourth and fifth joints are shorter in proportion to thickness, sixth joint much longer than the fifth but slightly shorter than the seventh with claw.

Abdomen somewhat longer than the two posterior thoracic segments combined (fig. 2a). Pleopods (fig. 2l) with the rami well developed though smaller than in *L. profunda*; each ramus with setæ only on the terminal margin and the setæ are shorter than the rami and not plumose; in young specimens with the last pair of thoracic legs still wanting the pleopods are also wanting (fig. 2n). Sixth segment short, shorter than the two preceding segments combined and posteriorly broadly rounded (fig. 2m). — Uropods as long as the sixth segment (figs. 2m and 2n); peduncle broad but distinctly longer than broad, produced in a triangular plate, which is as long as or longer than the upper margin of the peduncle and its obtuse end bears one long and one short seta; endopod moderately robust, without any vestige of a division into two joints.

Length of the largest specimen from Stat. 58 is 2.5 mm, of the specimen from Stat. 24 2.8 mm.

Remarks. This species is distinguished from *L. glacialis* especially by the shape of the fixed

finger of the chelæ; from *L. profunda* it is distinguished by several features, among which may be pointed out the quite different shape of the fixed finger of the chela and the short and not plumose setæ of the pleopods.

Fig. 2f represents the maxillipeds and fig. 2e the mandibles of this species. The last-named figure shows that the mandibles are somewhat thick and their molar processes decrease slightly in thickness to the end, which is cut off very obliquely and adorned with about three teeth. The molar processes differ therefore materially from those in the species figured by Sars and remind one more of those in *L. ventralis* as described on p. 91, though differing in the armature of their end.

Occurrence. *L. latiremis* has been taken by the "Ingolf" at three stations.

East of Iceland: St. 58: Lat.  $64^{\circ}25'N.$ , Long.  $12^{\circ}09'W.$ , 211 fm., temp.  $0.8^{\circ}$ ; 12 spec., but the majority juvenile without pleopods.

North of Iceland: St. 126: Lat.  $67^{\circ}19'N.$ , Long.  $15^{\circ}52'W.$ , 293 fm., temp.  $\div 0.5^{\circ}$ ; 1 juv. spec.

— — — St. 124: Lat.  $67^{\circ}40'N.$ , Long.  $15^{\circ}40'W.$ , 495 fm., temp.  $\div 0.6^{\circ}$ ; 1 spec.

#### 65. *Leptognathia glacialis* n. sp.

(Pl. X, figs. 3a—3b).

Female (without marsupium). This species, of which only a single specimen is at hand, is closely allied to *L. latiremis*, differing only in the shape of the chelæ and a little in the uropods. When the chela is seen vertically from the outer side (fig. 3a) it is observed, that the major part of its posterior margin is considerably convex with two setæ, the incisive margin a little sinuate and its proximal half slightly concave with about seven rounded saw-teeth; the movable finger is very much narrower than the proximal third of the fixed finger and has a minute tooth near the middle of its incisive margin; when the fingers have their apical parts crossed a long and moderately broad interval is found between their incisive edges. The uropods (fig. 3b) have the produced part of the peduncle considerably shorter and more rounded than in the two other species of group d.

Length of the specimen 2.8 mm.

Occurrence. This species has been taken by the II<sup>d</sup> Amdrup Expedition at East Greenland at a single locality.

Fleming Inlet: Lat.  $71^{\circ}51'N.$ , Long.  $22^{\circ}27'W.$ , 118 fm., red clay; 1 spec.

#### <sup>61</sup> *Haplocope* G. O. Sars.

This genus, established on a single species, is so closely allied to *Leptognathia*, that it would perhaps be advisable either to cancel it or to divide *Leptognathia* into several genera. On p. 9 and 65—66 I have pointed out why I think it premature to subdivide the last-named genus, but as *Haplocope* has been established many years ago it might probably be nearly impossible to get it cancelled. *Haplocope angusta* G. O. Sars is a slender species with long uropods and the exopod of these appendages two-jointed; according to Sars it differs from *Leptognathia* in having the molar process of the mandibles

rather strong, cylindric and armed at the tip with dentiform tubercles, furthermore by having the pleopods uniramous without setæ. Dollfus has established a new species as *Haplocope* (?) *abyssorum*, but according to his figures I suppose that this species, which has no rami on the pleopods, does not belong to *Haplocope*, but either to *Leptognathia* or, and more probably, be the type for a new genus. — From the "Ingolf" I have a new species which is allied to *H. angusta* in the mandibles (fig. 4c) and in all other features of some importance excepting that the uniramous pleopods have very long setæ. I think that the best external character for *Haplocope* is that the pleopods are uniramous.

66. *Haplocope linearis* n. sp.

(Pl. X, figs. 4a—4f).

Female. Slender, between eight and eight and a half times as long as broad, tapering somewhat in breadth from the second thoracic segment to the end of abdomen (fig. 4a). — Carapace about as long as second segment plus half of the third, slightly narrower than second segment, not much longer than broad, about twice as broad behind the middle as at the front end and with the lateral margins very moderately convex.

Antennulæ (fig. 4b) much shorter than the carapace, somewhat robust. First joint somewhat shorter than the other joints combined, not fully twice as long as deep; second joint not quite half as long as the first and feebly produced above, only a little longer than the third and a little shorter than the fourth joint; longest terminal setæ about as long as the two distal joints combined. — Antennæ somewhat short, with fourth and fifth joints completely fused.

Chelipeds (fig. 4b) somewhat small. The basal joint with the posterior protuberance well developed, about as long as deep, with its rounded hind margin moderately distant from the lower front angle of second thoracic segment. Carpus considerably longer than the basal joint, twice as long as deep, with the lower margin considerably convex. Chela small, somewhat shorter than the carpus and somewhat more than twice as long as broad; movable finger as long as the anterior margin of the hand and towards the base much narrower than the fixed finger which has two long setæ on its straight posterior margin towards the hand.

The thoracic segments (fig. 4a) more or less distinctly angular, and on the second segment their lateral angles are situated far in front, on the following segments gradually more backwards, consequently on the seventh segment only a little from the posterior margin. Third segment is more than half as long again as the second, slightly longer than broad and slightly shorter than fifth segment. — Thoracic legs slender and subequal in length, moderately long. Second pair (fig. 4b) with fourth and fifth joints subequal in length and their terminal spines long; sixth joint not fully half as long again as the fifth and a little shorter than seventh joint with claw. Three posterior pairs (fig. 4d) with most of the spines moderately long and their sixth joint a little shorter than seventh with claw.

Abdomen slightly shorter than the two preceding segments combined and the first segment conspicuously narrower than the seventh thoracic segment. Five anterior segments with the ventral margins considerably or very moderately convex (fig. 4f). Pleopods (figs. 4e and 4f) long and narrow;

peduncle very oblong; the single ramus half as long again as the peduncle, about four times as long as broad, with the end cut off obliquely; on this terminal margin about seven fine, extremely long setæ are inserted, some of them about two and a half times as long as the ramus; no setæ are found on the lateral margins of the rami. Sixth segment as long as, or a little longer than, the two preceding segments together. — Uropods (fig. 4f) slender and long, from a little shorter to a little longer than the three posterior segments combined; peduncle long, about as long as the fifth segment and more than twice as long as deep; endopod with first joint a little or conspicuously longer than the second; exopod very slender, half as long as the endopod and with its two joints equal in length.

Length of a female with marsupium 2<sup>mm</sup>.

Remarks. This small and slender species is easily distinguished from all North Atlantic or Arctic forms hitherto known by its long and uniramous pleopods with very long setæ.

The mandibles are shown in fig. 4c; a description is scarcely needed beyond that given in the remarks on the genus.

Occurrence. Taken by the "Ingolf" at a single station.

Davis Strait: St. 25: Lat. 63° 30' N., Long. 54° 25' W., 582 fm., temp. 3.3°; 12 spec.

### <sup>1</sup> *Leptognathiella* n. gen.

This genus is established on a new species which in a few features differs materially from *Leptognathia* and *Haplocope*.

The body is extremely slender. The four-jointed antennulæ differ from those of *Leptognathia* by having the second joint strongly produced above (Pl. X, figs. 5b and 5g) into a triangle overlapping a part of third joint; besides second joint, seen from the side (figs. 5d and 5g), increases in depth from the base to beyond the middle. (Mouth-parts unknown). Chelipeds normal, with the basal joint having the hind margin of the well developed posterior protuberance free and rounded. Thoracic legs built as in *Leptognathia*, short; three anterior pairs thick. Pleopods wanting in the female. Last abdominal segment with the posterior margin between the uropods feebly concave (fig. 5c); uropods extremely long, curved downwards, biramous (figs. 5f and 5i), with the endopod two-jointed, the short exopod one-jointed.

Remarks. Though the characters pointed out as generic are not very valuable, the aspect of the animal is so different from that of the forms of *Leptognathia* that the establishment of a new genus seemed to me to be necessary.

#### 67. *Leptognathiella abyssii* n. sp.

(Pl. X, figs. 5a—5i).

Female (without marsupium). Body extremely slender, between ten and nine and a half times as long as broad (fig. 5a), broadest at the middle of the thorax which is a little broader than the carapace and somewhat broader than the abdomen. — Carapace about as long as the second plus

half of the third thoracic segment, considerably longer than broad (fig. 5b), at the front end somewhat more than half as broad as behind the middle; the lateral margins posteriorly somewhat convex, anteriorly a little concave.

Antennulæ (figs. 5b and 5d) nearly as long as the carapace, moderately strong. First joint slightly longer than the two next joints combined, somewhat more than twice as long as deep, somewhat produced above and before the middle considerably deeper than towards the end. Second joint extremely produced above, increasing in depth from the base to the end of the lower margin and its upper margin is nearly two-thirds as long as that of the first joint. Third joint considerably tapering, with the lower margin about twice as long as the upper; fourth joint slenderly conical, a little longer than the lower margin of third joint, considerably shorter than its terminal setæ. — Antennæ short, even a little shorter than the two proximal antennular joints combined; fourth and fifth joints completely fused.

Chelipeds (fig. 5g) somewhat robust. The basal joint even a little longer than the carpus, with the posterior protuberance large, as long as deep and its rounded hind margin reaching behind the anterior lower end of second thoracic segment. Carpus nearly ovate, slightly more than half as long again as deep. Chela a little longer than the carpus, about twice as long as broad, with the major part of its posterior margin straight and furnished with two long setæ; movable finger almost as long as the anterior margin of the hand and towards the base much narrower than the fixed finger.

Lateral margins of the thoracic segments (fig. 5a) not angular but evenly and moderately convex. Second segment somewhat shorter than the third which is slightly shorter than the fifth or the sixth. — Thoracic legs short. The two anterior pairs uncommonly thick (fig. 5g); third joint with a very long, spiniform seta from the posterior angle; fourth and fifth joints very thick; subequal in length and with the terminal spines long or rather long; sixth joint considerably longer than the fifth and slightly longer than seventh with claw. Three posterior pairs somewhat slender (fig. 5e) with their spines well developed; fifth joint even longer than the sixth and slightly longer than seventh without claw.

Abdomen a little shorter than the two preceding segments combined. Five anterior segments (fig. 5f) with the ventral margin moderately convex; pleopods wanting. Sixth segment (fig. 5c) scarcely as long as the two preceding segments combined, transverse, with the hind margin long and a little concave. — Uropods, inserted on the postero-lateral angles which are cut off obliquely, are only a little shorter than the five posterior segments combined and somewhat robust; the peduncle as long as the sixth segment, seen from the side (fig. 5f) curved a little downwards, with the lower margin concave; endopod curved downwards as the peduncle, almost thicker a little from the end than near the base, two-jointed, with the second joint more than twice as long as the first; exopod slender, as long as the first joint of the endopod, one-jointed.

Length of a female without marsupium 2<sup>mm</sup>.

Subadult Male. Similar to the female in most features, but differing in some particulars. — The antennulæ (fig. 5g), especially their two proximal joints, somewhat thicker than in the female. — Three posterior pairs of legs (fig. 5h) have the seventh joint and the claw considerably longer than in the female, subequal in length and together twice as long as sixth joint. — Abdomen (fig. 5i)

a little longer than the two preceding segments combined; pleopods well developed, biramous, with the exopod much longer than the peduncle and its terminal setæ about as long as the pleopod. — Length 2.1<sup>mm</sup>.

Remarks. This small and very slender species is easily distinguished from all other forms by its very long and peculiarly shaped uropods.

Occurrence. It has been taken by the "Ingolf" at the two deepest stations.

South-West of Cape Farewell: St. 38: Lat. 59° 12' N., Long. 51° 05' W., 1870 fm., temp. 1.3°; 3 spec.

— — — — — St. 22: Lat. 58° 10' N., Long. 48° 25' W., 1845 fm., temp. 1.4°; 1 spec.

### **Cryptocope** G. O. Sars.

This genus was established in 1880 on two species, *C. abbreviata* G. O. Sars and *C. Voringii* G. O. Sars. *C. abbreviata* must be considered the type, at it was described several years before the other species and by Sars placed before *C. Voringii*, when he established the genus. Later I established *C. arctica* which is related to *C. abbreviata*. Norman & Stebbing established *Strongylura arctophylax*, which is nearly related to *C. Voringii* and must be transferred to *Cryptocope*. This genus is closely related to *Leptognathia*, the only important difference between the two genera being the existence of four pairs of marsupial lamellæ in *Leptognathia* and only a single pair in *Cryptocope*. But females with marsupium are known only of *C. abbreviata* and *C. arctica*, while they are unknown not only of *C. arctophylax* but of *C. Voringii*; as far as I may infer from Sars' detailed description of this species. But the genus may be divided into two groups, the first comprising *C. abbreviata* and *C. arctica*, which are small and very thick species and besides closely allied, the second group comprising *C. Voringii* and *C. arctophylax*, both large, less robust and closely allied but differing much in the relative length of the thoracic segments and in general aspect from the two other species. As the marsupium is unknown in these two large species it may be somewhat uncertain whether they have only a single pair of marsupial lamellæ, and if in the future that should prove not to be the case, these two species must be removed from *Cryptocope* and a new genus be formed for them. But at least provisionally they may be referred to *Cryptocope*.

#### 68. **Cryptocope arctica** H. J. Hansen.

(Pl. XI, figs. 1a—1h.)

- ! 1886. *Cryptocope arctica* H. J. Hansen, *Dijmphna-Togtets zool.-bot. Udbytte* p. 209, Tab. XXI, fig. 4.  
 1887. — — — — — *Vidensk. Medd. naturhist. Forening i Kjobenhavn for 1887*,  
 p. 180, Tab. VII, Fig. 1—1c.

Female. Extremely thick (fig. 1a), from four to four and a half times as long as broad. — Carapace extremely large (fig. 1a); only a little shorter than the four following segments combined, somewhat longer than broad, at the front end scarcely half as broad as somewhat behind the middle, with the lateral margins somewhat convex.



Antennulæ somewhat long in proportion to the animal (fig. 1a), being somewhat more than half as long as the carapace and rather slender (fig. 1b). First joint somewhat shorter than the other joints combined, slightly more than twice as long as deep and a little more than twice as long as the second which is not produced above; third joint a little longer than deep, rectangular and considerably shorter than the second; fourth joint uncommonly long, as long as second and third joints combined, slender; longest terminal seta nearly as long as the three distal joints combined. — Antennæ with fourth and fifth joints completely fused without any vestige of an articulation, about twice as long as the penultimate joint.

Chelipeds (figs. 1b and 1c) somewhat large and moderately strong. Basal joint posteriorly produced into a considerable free portion bent much upwards and reaching distinctly behind the carapace. Carpus somewhat less than twice as long as deep, nearly oblong-ovate, with the lower margin considerably convex. Chela somewhat longer than the carpus, long and somewhat slender, being a little less than three times as long as broad, with two long setæ near the middle of the concave posterior margin and with the hand distinctly narrower at the base of the movable finger than near the middle; movable finger considerably or rather much shorter than the anterior margin of the hand, only a little narrower than the fixed finger (fig. 1c), the incisive margin of which is somewhat sinuate, showing two flatly vaulted and badly defined protuberances.

Thoracic segments (fig. 1a) with their lateral margins very convex, producing deep incisions between the segments; some of them are subangular. Second to fourth segment short, increasing in length backwards, together about as long as the sum of the fifth and the sixth; second segment decreases considerably in breadth from near the front to the posterior end; third segment is broadest somewhat before, and fourth a little before, the middle, while the three posterior segments are broadest behind their middle. Fifth segment is almost broader than the second and somewhat broader than the fourth or the seventh. — Thoracic legs (figs. 1b and 1d) long and slender; the anterior pair have the joints from the fourth to the sixth somewhat increasing in length, and the sixth joint, which is slender and long, is a little longer than seventh with claw. Posterior pairs (fig. 1d) have the spines of moderate length; sixth joint is very long and considerably or much longer than seventh with claw.

Abdomen somewhat longer than the two preceding segments combined (fig. 1a), seen from above tapering considerably backwards to the posterior margin which has a very obtuse angle; four posterior segments each with a pair of sublateral setæ (figs. 1a and 1e). Ventral side of the five anterior segments (figs. 1e and 1f) strongly serrate, as each segment bears a high, subtriangular or subquadrangular protuberance. Pleopods generally small and their rami terminating in some moderately long setæ (fig. 1e); in the largest specimens from the "Ingolf" Stat. 25 the pleopods are very small (fig. 1f) and their setæ nearly rudimentary. Sixth segment longer than the two preceding segments combined. — Uropods small; peduncle short and much deeper than long, thick; the endopod with its two joints equal in length; exopod more than half as long as the endopod, more or less distinctly two-jointed, with the joints subequal in length.

Length of females with marsupium 1.67—2 mm.

Subadult Male. Conspicuously more slender and distinctly smaller than adult females. — Antennulæ (fig. 1g) considerably thicker than in the female; first joint somewhat less than twice as

long as deep. — Five anterior abdominal segments (fig. 1 h) proportionately longer than in the females, with the pleopods somewhat long, well developed.

Remarks. *C. arctica* is allied and rather similar to *C. abbreviata* G. O. S., but according to Sars' text and figures and my examination of a Norwegian specimen given by him *C. abbreviata* is smaller than *C. arctica*, its pleopods have no setæ on the end of their rami, the exopod of the uropods is one-jointed and, what is of special importance, the chelipeds are rather different, having the carpus only one-third as long again as deep and the chela distinctly broader, two and a half times as long as broad, with a single setæ on the posterior margin.

In vain I have looked for differences of possibly specific value between the specimens from my very different localities; my type from the Kara Sea agrees completely with the specimens from East Greenland and from the "Ingolf" Stations. — Some among the specimens from the "Ingolf" Stat. 25 are larger than the others and, as already stated, have the pleopods less developed than all other specimens seen, but no other difference could be discovered.

Occurrence. It has been taken by the "Ingolf" at nine stations.

Davis Strait:	St. 32: Lat. 66° 35' N., Long. 56° 38' W., 318 fm., temp. 3.9°; 11 spec.
— —	St. 25: Lat. 63° 30' N., Long. 54° 25' W., 582 fm., temp. 3.3°; 29 spec.
— —	St. 24: Lat. 63° 06' N., Long. 56° 00' W., 1199 fm., temp. 2.4°; 1 spec.
— —	St. 36: Lat. 61° 50' N., Long. 56° 21' W., 1435 fm., temp. 1.5°; 7 spec.
Denmark Strait:	St. 90: Lat. 64° 45' N., Long. 29° 06' W., 568 fm., temp. 4.4°; 4 spec.
South-West of Iceland:	St. 81: Lat. 61° 44' N., Long. 27° 00' W., 485 fm., temp. 6.1°; 1 spec.
— — —	St. 78: Lat. 60° 37' N., Long. 27° 52' W., 799 fm., temp. 4.5°; 27 spec.
East of North-Iceland:	St. 101: Lat. 66° 23' N., Long. 12° 05' W., 537 fm., temp. ÷ 0.7°; 1 spec.
North of East-Iceland:	St. 126: Lat. 67° 19' N., Long. 15° 52' W., 293 fm., temp. ÷ 0.5°; 4 spec.

Furthermore this species has been taken at a number of arctic localities on both sides of Greenland, especially East-Greenland, and off Jan Mayen by various Expeditions.

Baffin Bay:	Lat. 72° 20' N., Long. 59° 39' W., 170 fm., clay with stones; 1 spec. "Ingegerd och Gladan" 1871. (H. J. Hansen).
East Greenland: Henry Land:	Lat. 69° 34' N., Long. 23° 35' W., 20 fm.; 17 spec. II <sup>d</sup> Amdrup Exp.
— — Hurry Inlet:	Lat. 70° 36' N., Long. 22° 31' W., 50 fm.; 2 spec. — — —
— — — —	10 fm.; 1 spec. — — —
— — Forsblad Fjord:	Lat. 72° 27' N., Long. 25° 28' W., 90–40 fm.; 1 spec.
— — — —	II <sup>d</sup> Amdrup Exp.
— — Stormbugt, ca. Lat. 77° N.,	15–20 fm.; 1 spec. Danmark Exped. (Steffensen).
Jan Mayen:	50–60 fm.; 1 spec. II <sup>d</sup> Amdrup Exped.

Distribution. The type of *C. arctica* was taken in the Kara Sea, 64 fm. (H. J. H.). Later Stebbing has mentioned specimens from Novaia Zemlia or Spitzbergen, 100 fm. Recently it has been mentioned by Sars from the Gaase Fjord, Ellesmere Land (at ab. Lat. 78° N., on the western side of Smith Sound), 60 m. (2<sup>d</sup> Fram Exped.).

The geographical and bathymetrical distribution of this species is very interesting. In the Kara Sea, at East Greenland, Jan Mayen and in Smith Sound it has been taken in depths between

10 and 90 fathoms; in the cold area it was taken by the "Ingolf" at two stations, 293 and 537 fm.; in the warm area by the "Ingolf" at seven stations at depths varying from 318 to 1435 fathoms.

69. **Cryptocope Voringii** G. O. Sars.

(Pl. X, figs. 6a—6d.)

1877. *Tanais Voringi* G. O. Sars, Arch. for Math. og Naturv. B. II, p. 347.  
 1881. *Cryptocope Voringii* — Arch. for Math. og Naturv. B. VII, p. 50.  
 1885. — — — Den norske Nordhavs-Exp., Crust. I, p. 74, Pl. VII, figs. 5—16.

Female (without marsupium). G. O. Sars has published a very detailed description with several figures of this sex, but a number of observations may be added.

Body, carapace, thoracic segments and abdomen, seen from above, as to all particulars nearly as in *C. arctophylax* Norm. & Stebb. (comp. description and fig. 2a on Pl. XI of this species).

Antennulæ (fig. 6a) somewhat shorter than the carapace, moderately slender. First joint considerably shorter than the three other joints combined, about two and half times as long as deep and feebly tapering; second joint distinctly less than half as long as the first and considerably produced above; third joint somewhat shorter than the second, almost quadrangular; fourth joint long, nearly as long as third and second joints combined. — Antennæ somewhat long; fourth and fifth joints completely fused.

Chelipeds robust (fig. 6a). A coxal joint is well marked off, large, somewhat triangular and well chitinated on the outer side. Basal joint posteriorly produced into a moderately long, free, moderately thick protuberance directed backwards and upwards, and the hind margin of this protuberance is situated beneath the front margin of second thoracic segment. Carpus only somewhat longer than deep, being somewhat expanded downwards and showing a somewhat protruding triangle below at the front lower angle of the ischium. Chela almost half as long again as the carpus, robust, only a little more than twice as long as broad; movable finger somewhat shorter than the anterior margin of the hand, robust, with a conspicuous, subtriangular and moderately low tubercle at the middle of the incisive margin (fig. 6b); fixed finger somewhat thicker than the movable, with three setæ on its posterior margin, while its incisive margin has a large, broad and somewhat high, rounded tubercle beyond the middle and before the middle a low and badly defined protuberance; both fingers with their end obtuse.

Thoracic legs rather long and slender, with their spines short or moderately short. Anterior pairs (fig. 6c) with the joints increasing much in length from the fourth to the sixth; sixth joint very long and slightly longer than seventh with claw. Posterior pairs as in the next species (vid. infra).

Abdomen (fig. 6d) somewhat shorter than the three preceding segments combined. Five anterior segments with their ventral surface peculiarly armed; first segment with the ventral process somewhat short, obliquely and obtusely triangular; process of second segment long, longer than broad, obliquely triangular, somewhat curved and directed much backwards; the processes decrease much in length from second to fourth segment, while the process on fifth segment is only a moderately low, rounded tubercle. Pleopods very small, biramous, without setæ. (In juvenile specimens with the seventh pair

of thoracic legs not developed the pleopods and the ventral processes are not found). Sixth segment about as long as fifth, fourth and half of the third segment combined. — Uropods (fig. 6d) small and robust; both rami distinctly two-jointed (also in juvenile specimens) and the exopod somewhat shorter and much thinner than the endopod.

Length of the single larger specimen 4<sup>mm</sup>; Sars stated that the female is 5.5<sup>mm</sup>. long.

Remarks. The differences between the females of *C. Voringii* and *C. arctophylax* are pointed out in the "Remarks" on the latter species. Sars stated that the uropods of the female have the exopod one-jointed, but this is decidedly incorrect; his figure of the chela is not good, and he has described and figured (figs. 5 and 6) the terminal part of the thoracic legs, viz. seventh joint with claw, quite erroneously.

Occurrence. Taken by the "Ingolf" at three stations in the cold area.

North-West of the Faeroes: St. 138: Lat. 63° 26' N., Long. 7° 56' W., 471 fm., temp. ÷ 0.6°; 1 large spec.

South of Jan Mayen: St. 117: Lat. 69° 13' N., Long. 8° 23' W., 1003 fm., temp. ÷ 1.0°; 1 juven. spec.

— — — St. 116: Lat. 70° 05' N., Long. 8° 26' W., 371 fm., temp. ÷ 0.4°; 1 juven. spec.

Distribution: The specimens seen by Sars had been taken at three places in the cold area West of Norway, from Lat. 63° 10' to Lat. 67° 56' N., and in depths ranging from 350 to 778 fathoms; temperatures at the bottom from ÷ 1.0° to ÷ 1.4°.

#### 70. *Cryptocope arctophylax* Norm. & Stebb.

(Pl. XI, figs. 2a—2k).

1886. *Strongylura arctophylax* Norman & Stebbing, Transact. Zool. Soc. London, Vol. VII, Pt. IV, p. 116, Pl. XXIV, fig. 3.

Young Female and subadult Male. Body of the subadult male (fig. 2a) robust, slightly more than five times as long as broad and the anterior half conspicuously broader than the posterior; the young female is about five and a half times as long as broad. — Carapace nearly as long as the two following segments combined, as long as or slightly longer than broad, anteriorly somewhat less than half as broad as behind the middle, where the lateral margins are very convex.

Antennulæ in the subadult male (fig. 2a) a little, in the young female somewhat, shorter than the carapace. In the female (fig. 2e) the antennulæ are somewhat slender; first joint considerably shorter than the three following joints combined, somewhat less than three times as long as deep and feebly tapering; second joint somewhat produced above, not fully half as long as the first, but much longer than the third which is a little shorter above than below; fourth joint almost as long as third and second joints combined and a little longer than the terminal setæ. In the subadult male the antennulæ (fig. 2b) are much thicker; first joint slightly more than half as long again as deep; second joint as deep as the length of its upper margin, which is half as long as the first joint; third joint more than half as deep again as the length of its upper margin; fourth joint uncommonly long, conspicuously longer than the two preceding joints combined, with the proximal portion somewhat thickened, and the terminal setæ are considerably shorter than the joint. Antennæ somewhat long, in the young female (fig. 2e) with, in the subadult male without, a vestige of an articulation between fourth and fifth joints.

Chelipeds robust and on the whole agreeing with those in *C. Voringii* excepting in the armature of the fixed finger (fig. 2c), which has the distal large tubercle furnished with two incisions dividing its margin into three rounded teeth, and the proximal protuberance is higher and better defined than in *C. Voringii*; in my specimens both fingers have their ends acute, while they are obtuse in my female of *C. Voringii*.

Thoracic segments (fig. 2a) decrease distinctly in breadth from second to sixth. Second segment is slightly shorter than the third which is as long as the fourth and only slightly shorter than the fifth. Second to fourth segments increase conspicuously in breadth from their posterior to the anterior, rather broadly rounded angle, while fifth and sixth segments are subrectangular with their angles rounded and the lateral margins feebly protuberant behind the middle; seventh segment broader behind than in front. — The thoracic legs as in *C. Voringii*; fig. 2d shows that in the posterior pairs sixth joint is considerably longer and thinner than the fifth and distinctly longer than seventh with claw; fig. 2f shows that the upper terminal spine on sixth joint is strong and adorned with some five pairs of lateral, oblique branches (a somewhat similar spine is found in *C. Voringii*).

Abdomen in the subadult male (fig. 2a) as long as the three preceding segments combined; its anterior half is as broad as seventh thoracic segment, but from the fourth segment the abdomen tapers conspicuously; in the young female the last thoracic segment has not arrived at full size and the abdomen is somewhat narrower than sixth segment, slightly longer than fifth and sixth segments combined and not tapering, as the sixth segment is fully as broad as the first. In the male (fig. 2d) the armature of the ventral side is strongly developed; the process from third segment is very long, acute, subtriangular, with the anterior margin a little convex and the posterior margin somewhat concave, directed mainly downwards; the process from second segment is much shorter than the third though still large, triangular and as long as broad; the first segment has only a somewhat low, triangular tubercle, fourth segment a somewhat higher tubercle, and on the fifth segment the protuberance is rudimentary. In the young female the processes (fig. 2g) or tubercles are conspicuously less developed, but show nearly the same relative proportions as to length. Pleopods completely wanting in the female, while in the subadult male they are well developed (fig. 2d), somewhat long, biramous, with moderately long setae. — Uropods (figs. 2d and 2g) distinctly more slender and longer than in *C. Voringii*; peduncle at least as deep as long; endopod with the two joints subequal in length; exopod two-jointed, somewhat shorter and considerably thinner than the endopod.

Length of the subadult male 3.8 mm., of the young female 3.3 mm. (The female specimen described by Norman & Stebbing was 4 mm. long).

Adult Male (figs. 2h—2k). On the whole somewhat reminding of males of the genus *Leptognathia*. — Antennulae (fig. 2h) as long as the carapace and second thoracic segment combined, seven-jointed. First joint twice as long as deep; second joint thick and slightly more than half as long as the first; third and fourth joints very short and fifth joint short, all three somewhat cup-shaped and fourth and fifth joints each with a close row of extremely long sensory hairs; sixth joint about as long as the four preceding joints combined, at the end with a row of very long sensory hairs; seventh joint long, nearly as long as the first and much thinner than the sixth, slightly longer than the terminal setae.

Chelipeds (fig. 2h) moderately strong, somewhat long. The coxal joint is distinctly marked off; the basal joint is very thick, only a little shorter than the carpus, which is a little less than twice as long as deep. Chela considerably longer than the carpus, inconsiderably more than twice as long as broad (fig. 2i); movable finger almost as long as the anterior margin of the hand and distally much curved, and the major middle portion of its incisive margin is irregular with several moderately small or very small teeth and two minute spines; the fixed finger has nearly the proximal half of its incisive margin finely serrate, while the distal half has the two protuberances found in the immature male, but both are lower and the distal protuberance without marginal incisions and teeth excepting a single small, acute tooth at its end and just at the origin of the terminal, oblong-triangular, acute part of the finger.

Thoracic legs long and slender (fig. 2h), subsimilar in all particulars excepting that the spines on the anterior pairs are very short, on the posterior pairs somewhat more developed; sixth joint is very long and considerably longer than seventh with claw.

Abdomen (fig. 2k) somewhat longer and, as usually, conspicuously thicker than the thoracic segments. Five anterior segments with ventral tubercles; the tubercle on third segment triangular but almost twice as broad as high; from that segment the protuberances decrease in size both forwards and backwards and all are somewhat or fully rounded. Pleopods strong with very long setæ. — Sixth segment strongly produced backwards in a somewhat slender process with the upper margin distinctly concave; the result is that the uropods originate considerably before the middle of the segment and terminate before its end. — Uropods (fig. 2k) with the peduncle about as long as deep; endopod three-jointed, with first joint thicker and much shorter than the second, which is a little shorter than the third; exopod very slender and as long as the sum of two proximal joints of the endopod, two-jointed, the first joint very short, the second long.

Length 3.8 mm.

Remarks. *C. arctophylax* is allied to *C. Voringii*, but the female and the subadult male of the two species differ sharply in the ventral abdominal processes, the third process being much longer than the others in *C. arctophylax*, while in *C. Voringii* the second process is the longest; furthermore the female of *C. Voringii* has small pleopods without setæ, while in the female *C. arctophylax* pleopods seem to be wanting; a third character is the difference in the above-described distal tubercle on the incisive margin of the fixed finger of the chelæ. — According to the figures of the male of *C. Voringii* published by Sars this animal seems to differ sharply from the male of *C. arctophylax* by having the first joint of both endopod and exopod of the uropods much longer in proportion to the second joint than in the last-named species, and in *C. Voringii* the terminal joint of the antennulæ is only somewhat longer than sixth joint, while in *C. arctophylax* the seventh joint is more than twice as long as the sixth.

*C. arctophylax* was established by Norman & Stebbing on a single female specimen; they referred, however, the species wrongly to the genus *Strongylura*, but it must be emphasized that their work was written before any figure of *Cryptocope Voringii* G. O. S. or *Strongylura cylindrata* G. O. S. had been published. Stebbing's figures of the animal from above, of the cheliped, thoracic legs, etc., leave no doubt that the animal is either *C. Voringii* or *C. arctophylax* as defined here; the locality for the specimen and the ventral abdominal process shown on his fig. III Pl. but not mentioned in the

text shows that the animal cannot be *C. Voringii*. One small error may be noted, viz. that the English authors stated the exopod of the uropods to be unjointed, while it certainly is two-jointed.

Occurrence. *C. arctophylax* has been taken by the "Ingolf" at two deep-water stations in the warm area.

Davis Strait: St. 24: Lat.  $63^{\circ}06'N$ , Long.  $56^{\circ}00'W$ , 1199 fm., temp.  $2.4^{\circ}$ ; 1 subadult male, 1 young female and 1 juvenile specimen.

— — St. 36: Lat.  $61^{\circ}50'N$ , Long.  $56^{\circ}21'W$ , 1435 fm., temp.  $1.5^{\circ}$ ; 1 adult male and 1 mutilated juvenile specimen.

Distribution. The only specimen mentioned in the literature is the type, which has been dredged by the "Porcupine" at Lat.  $56^{\circ}24'N$ , Long.  $11^{\circ}49'W$ , "midway between Ireland and Rockall", 1380 fathoms. — *C. arctophylax* has only been found in the warm area, while *C. Voringii* is confined to the cold area.

### <sup>16</sup>*Tanaella* Norm. & Stebb.

This genus was established on a single specimen of a new species, *T. unguicillata* Norm. & Stebb., and I possess a specimen of this species and a specimen of a hitherto unknown form; all three specimens hitherto known are females without marsupium. The genus is related to *Leptognathia* but differs in some particulars. A brief description of the genus may be given here.

Body somewhat robust. The antennulæ have the second joint longer than third and fourth joints combined, and the third joint is very short. Chelipeds unusually robust. Anterior pairs of thoracic legs have the rather long sixth joint longer than the seventh with claw; while on the posterior pairs sixth joint is considerably shorter than seventh with claw. Five anterior abdominal segments very short and peculiarly shaped so that they, seen from the side, are somewhat angularly bent at the median lateral line; sixth segment long, at least as long as the four preceding segments combined. Pleopods either small without setæ or wanting. Uropods robust, with a styliform, unjointed endopod and no exopod. (Mouth-parts, marsupium and male unknown).

Remarks. *Tanaella* is related to *Strongylura* in having the sixth abdominal segment very long in proportion to the five anterior segments, but the whole abdomen in *Tanaella* is shorter in proportion to the thorax than in *Strongylura*. In the diagnosis of *Tanaella* Norman & Stebbing stated that no pleopods are found, but this feature cannot be maintained as a generic character, because my new species *T. ochracea* is closely allied to *T. unguicillata* excepting in the single feature, that it possesses small pleopods. The structure of the uropods seems to be a good character; besides the antennulæ and the elongate terminal part of the posterior pairs of legs seem to afford generic characters.

#### 71. *Tanaella ochracea* n. sp.

(Pl. XI, figs. 3a—3f.)

Female (without marsupium). Moderately robust (fig. 3a), a little more than six times as long as broad, subcylindrical, tapering slightly in breadth from the carapace to sixth abdominal segment, which is conspicuously broader than the preceding abdominal segments. — Carapace somewhat longer

than the two following segments combined, somewhat longer than broad, at the front end half as broad as a little behind the middle; the lateral margins considerably convex; the frontal process triangular, broad and of moderate length.

Antennulae (fig. 3b) a little shorter than the carapace, somewhat robust. First joint slightly longer than the three other joints combined, more than two and a half times as long as deep and with the proximal third rather expanded below. Second joint moderately produced above, conspicuously more than half as long as the first and somewhat longer than third and fourth joints combined, increasing distinctly in depth from the base to the end; third joint very short and fourth joint uncommonly short and somewhat robust; terminal setae somewhat or considerably longer than fourth joint. — Antennae long; fourth and fifth joints completely fused and conspicuously more than twice as long as the penultimate joint.

Chelipeds robust (fig. 3b). Basal joint long, even distinctly longer than the carpus; the posterior protuberance is very deep and its free, rounded hind margin reaches the front lower angle of second thoracic segment. Carpus ovate, scarcely half as long again as deep, ovate. Chela considerably longer than the carpus, twice as long as broad; movable finger much shorter than the anterior margin of the hand, strong, with a broad, very low, very flatly triangular protuberance on the incisive margin somewhat from its base (fig. 3c) and a minute, sharp denticle at the distal end of that protuberance; fixed finger very broad, with two strong setae on the posterior margin, while the incisive margin has at the base a somewhat deep and moderately narrow, not crenulated incision producing a small hole between the fingers when the chela is closed; beyond that incision the margin is somewhat undulate to rather near the end where it has a sharp tooth and beyond this a conspicuous incision; the terminal part of the finger is an oblong and somewhat curved triangle with the end acute.

Thoracic segments (fig. 3a) increase gradually in length from the second to the fifth; the lateral margins of each segment are nearly straight excepting at both ends, but the margins of seventh segment are somewhat convex. — Thoracic legs somewhat short. The two anterior pairs (fig. 3b) moderately slender, fourth joint with a rather long spine on the posterior angle; fifth joint a little longer than the fourth, with the anterior distal spine long and the posterior spine much shorter; sixth joint with fine denticles along the posterior margin and on the end (fig. 3d), considerably longer than the fifth and a little longer than seventh with the straight claw. Three posterior pairs moderately strong, with somewhat long spines on the fourth and especially on fifth and sixth joints (fig. 3e); sixth joint somewhat longer than the fifth but much shorter than the seventh with claw, the seventh joint being long but yet shorter than the very long claw, and both are finely ciliated below.

Abdomen somewhat shorter than the three preceding segments combined (fig. 3a). Five anterior segments short, scarcely as broad as the posterior thoracic segments, seen from the side (fig. 3f) a little angularly bent at the lateral margin; the ventral side with somewhat low, rounded protuberances. Pleopods very small, biramous, without setae. Sixth segment even perceptibly longer than the sum of the four preceding segments, seen from above (fig. 3a) broader than these segments and with the posterior margin and the lateral margins together evenly curved like the greater part of a circle. — Uropods a little shorter than sixth segment (fig. 3f); peduncle somewhat longer than deep; endopod about twice as long as the peduncle, styliform.



The body is shining and its anterior half deeply reddish yellow.

Length of the single specimen 3.0 mm.

Occurrence. It has been taken at the deepest "Ingolf" station.

South-West of Cape Farewell: St. 38: Lat. 59° 12' N., Long. 51° 05' W., 1870 fm., temp. 1.3°; 1 spec.

Remarks. *T. ochracea* differs from *T. unguicillata* Norm. & Stebb. especially in the shape of the incisive margins of the chelæ, the shape of the five anterior abdominal segments when seen from the side, the shape of the last segment from above and by possessing small pleopods.

72. ***Tanaella unguicillata*** Norm. & Stebb.

(Pl. XI, figs. 4a—4d.)

1886. *Tanaella unguicillata* Norman & Stebbing, Transact. Zool. Soc. London, Vol. XII, Pt. IV, p. 118, Pl. XXIV, fig. IV.

Female (without marsupium). The single specimen is so strongly curved that it was impossible to straighten it without breaking. But it seems to differ slightly from *T. ochracea* as to the general shape of the body, outline and relative length of the carapace and thoracic segments (comp. fig. IV D in the English paper quoted.)

Antennulæ (fig. 4a) somewhat shorter than the carapace, but otherwise almost as in *T. ochracea*, the most important difference being, that the second joint is proportionately a little longer and cylindrical, considerably more than half as long as the first joint and a good deal longer than the two distal joints together. — Antennæ with a feeble articulation between fourth and fifth joints, which are more than three times as long as the penultimate joint.

Chelipeds very robust (figs. 4a and 4b). The basal joint not fully as long as the carpus, very deep, with the hind margin of the deep posterior protuberance very flatly convex. Carpus not quite half as long again as deep. Chela somewhat longer than the carpus, distinctly less than twice as long as broad; movable finger much shorter than the anterior margin of the hand, with a somewhat high, triangular protuberance on the incisive margin somewhat from its base and a minute, sharp denticle just beyond that protuberance (fig. 4b); fixed finger very broad, with two strong setæ on its posterior margin, while its incisive margin has at the base a somewhat deep and long incision crenulated with some five or six obtuse saw-teeth, producing a small hole between the fingers when adduced, and beyond that incision the margin is somewhat undulate to rather near the end, where a very obtuse angle and beyond this a triangular incision are seen; the ends of both fingers are obtuse.

Three anterior pairs of thoracic legs (fig. 4a) proportionately more slender than in *T. ochracea* and decreasing conspicuously in length from second to fourth pair; fourth and fifth joints subequal in length and with the length of their spines as in *T. ochracea*; sixth joint much longer than the fifth or the seventh with its straight claw. Three posterior pairs (fig. 4c) nearly as in *T. ochracea*; seventh joint with its long claw much longer than the sixth joint, finely ciliated and nearly straight or curved distinctly upwards.

Abdomen only a little shorter than the three preceding segments combined, seen from the side (fig. 4d) uncommonly thick and thickest a little before the middle. Five anterior segments short, seen

from the side with their vertical margins most curiously bent twice at the lateral margin. Pleopods wanting. Sixth segment even a little longer than the four preceding segments combined; its posterior margin is not broadly rounded as in *T. ochracea* but a little produced behind with a somewhat obtuse angle. — Uropods much shorter than the sixth segment, thus somewhat shorter than in *T. ochracea*, with the endopod not quite twice as long as the peduncle, but otherwise nearly as in the last-named species.

The animal is somewhat light greyish.

Length of the single specimen about 3.2<sup>mm</sup>, thus a little larger than that of the English authors.

Remarks. The specimen described belongs unquestionably to *T. unguicillata*; especially the shape of the proximal parts of both fingers of the chelæ and the lateral view of the abdomen as compared with Stebbing's figures proves that beyond doubt. The main differences between *T. ochracea* and *T. unguicillata* have been pointed out in the "Remarks" on the first-named species.

Occurrence. It has been taken by the "Ingolf" at the following place.

South of West-Iceland: St. 69: Lat. 62° 40' N., Long. 22° 17' W., 589 fm., temp. 3.9°; 1 spec.

Distribution. The type of Norman & Stebbing was dredged by the "Porcupine" on the slope of the English Channel, Lat. 49° 7' N., Long. 10° 57' W., 96 fathoms. No other specimen has been recorded in the literature.

### **Strongylura** G. O. Sars.

This genus was established on a single species, *S. cylindrata* G. O. S., of a peculiar aspect. This form is in most characters allied to species of *Leptognathia* with the pleopods rudimentary or wanting, but it differs by having the abdomen in the female and the subadult male extremely long, only somewhat shorter or even as long as the five posterior thoracic segments combined, while the sixth abdominal segment is extremely long, at least a little longer than the three preceding segments combined, and the biramous uropods are small and thick. Furthermore it differs from *Leptognathia* and reminds of *Cryptocope arctica* and *Tanaopsis* in having third and fourth thoracic segments each conspicuously shorter than the fifth or the sixth segment, the three anterior segments together being in reality scarcely as long as the sum of fourth and fifth segments.

The "Ingolf" material contains two species which I refer to *Strongylura*; one of them is less characteristic than *S. cylindrata*, while the other species is somewhat difficult, but after long hesitation I have referred it to *S. cylindrata*.

*Cryptocope arctophylax*, established by Norman & Stebbing as a species of *Strongylura*, differs widely from this genus but is, as already stated, allied to *Cryptocope Voringii* G. O. S. No other species hitherto described has been referred to *Strongylura*.

### 73. **Strongylura cylindrata** G. O. Sars.

(Pl. XII, figs. 1a–11.)

1881. *Strongylura cylindrata* G. O. Sars, Archiv for Math. og Naturv., B. VII, p. 53.

! 1896. — — — Account Crust. Norway, Vol. II, p. 36, Pl. XVI, fig. 1.

In the last-named work Sars has given a good representation of this species, viz. figures of a female without marsupium from above and from the side, together with drawings of appendages. He presented the Copenhagen Museum with two of his co-types, but they differ in some points and especially in the antennulæ from his figures and description. A comparison between my fig. 1 g, drawn from one of his co-types, with his figures on Pl. XVI shows, that the antennulæ are much more slender than figured by Sars and above all that the moderately slender terminal joint is slightly shorter than the two preceding joints combined, while according to Sars that joint is much shorter than the sum of the two preceding joints and very thick. Furthermore my figures of second and sixth legs (figs. 1 h and 1 i) as compared with Sars' figures of second and seventh legs show that the thoracic legs drawn by him have the joints conspicuously shorter in proportion to thickness than in my Norwegian specimens presented by him. As to the relative length of thorax and abdomen, Sars' figures agree well with my Norwegian specimens, but in these the uropods are more remote from the end of abdomen (fig. 1 k) than according to his figures, in which the uropods reach beyond the end of abdomen which is not the case in his co-types mentioned, while it exists in all the "Ingolf" specimens. Sars stated that he had taken *S. cylindrata* at several places "in depths ranging from 50 to 200 fathoms".

Judging from these statements one might be tempted to suppose that Sars had mixed up two different species. But though the "Ingolf" material is small, it originates from three localities with the depth from about 1200 to near 1700 fathoms, two specimens from the cold and two from the warm area, and these specimens show various differences. Furthermore, the antennulæ show features intermediate between Sars' figures of *S. cylindrata* and his two co-types mentioned; the thoracic legs are in two "Ingolf" specimens about as drawn by Sars, in two other specimens still shorter and thicker. For such reasons I am apt to think that all specimens seen by Sars or me are in reality variations of the same species. But it may be of some significance to add some further notes on the "Ingolf" specimens from each locality.

The female from Stat. 113 (fig. 1 a), which measures 3.7<sup>mm</sup> in length, is more slender than any other of my specimens and than that figured by Sars, as it is even slightly more than nine times as long as broad. But its antennulæ (fig. 1 b) have the fourth joint shorter and thicker than in the specimens from the other stations, though less thick than in Sars' drawing (fig. 1 a<sup>1</sup>), while the chelæ are more robust and the thoracic legs (figs. 1 c and 1 d) shorter and thicker than in the specimen figured by Sars or in my specimens from other places. The chelæ (fig. 1 b) are slightly more than twice as long as broad; the abdomen is longer than in specimens from any other source, being as long as the five posterior thoracic segments plus more than half of second segment combined, while the sixth abdominal segment is only a little longer than the three preceding segments combined. In Sars' figures and in his two co-types the abdomen is scarcely as long as the five posterior thoracic segments combined, but its sixth segment is as long as the four preceding segments together. — The subadult male from the same place — Stat. 113 — agrees in all respects with the female and its antennulæ are but slightly thicker, but it has moderately developed pleopods, the rami of which are somewhat long in proportion to the peduncle and the setæ on their terminal margin short (as figured by Sars).

The subadult male from the "Ingolf" Stat. 24 (figs. 1 e and 1 f) agrees as to the relative length

of the thorax and abdominal segments, the length and thickness of the chelæ and the thoracic legs with Sars' figures. It may be mentioned that the chelæ in this "Ingolf" specimen (fig. 1e), in Sars' figure and in my Norwegian specimens are conspicuously more slender than in the above-described specimens from Stat. 113, the chela being somewhat more than twice as long as broad. But in this "Ingolf" specimen from Stat. 24 the antennulæ are intermediate between those from Stat. 113 and my Norwegian specimens (fig. 1g), especially their fourth joint is slightly shorter and distinctly thicker than in the last-named specimens. — The young male from the "Ingolf" Stat. 20 has the pleopods rudimentary; the sixth abdominal segment is as long as the five other abdominal segments combined, but as to the length and thickness of the thoracic legs, the length of abdomen in proportion to the thorax and the shape of the chelæ the specimen agrees with Sars' figures, while the antennulæ, and especially their short and thick fourth joint, are similar to those in the specimens from Stat. 113.

From this somewhat detailed investigation it may be seen that it is impossible to divide my somewhat scanty material from both the cold and the warm areas and from Norway into two or three species and besides to take the Norwegian specimens figured and described by Sars into account, because the characters are mingled apparently without reference to depth or temperature. Therefore I feel myself compelled to refer all specimens to the same species which shows considerable but gradual variation in several features.

Length of the largest specimen, the female from Stat. 113, 3.7<sup>mm</sup>, of my largest specimen from Norway 3.0<sup>mm</sup>.

Occurrence. It has been taken by the "Ingolf" at three stations.

Davis Strait: St. 24: Lat. 63°06' N., Long. 56°00' W., 1199 fm., temp. 2.4°;  
1 subadult male.

South-East of Cape Farewell: St. 20: Lat. 58°20' N., Long. 40°48' W., 1695 fm., temp. 1.5°;  
1 young male.

South of Jan Mayen: St. 113: Lat. 69°31' N., Long. 7°06' W., 1309 fm., temp. ÷ 1.0°;  
1 female and 1 subadult male.

Distribution. *S. cylindrata* was hitherto known only from several places at the southern and western coasts of Norway, "in depths ranging from 50 to 200 fathoms. It extends northwards to Selsovig, situated just within the polar circle."

#### 74. *Strongylura minima* n. sp.

(Pl. XI, figs. 5a—5d.)

Subadult Male. This tiny species is, seen from above (fig. 5a), moderately slender, about seven and a half times as long as broad, subcylindrical, yet tapering slightly towards both ends. — Carapace not quite as long as the three following segments combined, narrower than the next segment, much longer than broad, anteriorly conspicuously more than half as broad as behind the middle.

Antennulæ moderately robust (fig. 5b), slightly longer than the carapace. First joint two and a half times as long as deep, somewhat shorter than the three other joints combined; second joint somewhat produced above and half as long as the first; third joint middle-sized, distinctly longer than

deep; fourth joint somewhat shorter than the two preceding joints combined and much shorter than the longest terminal seta. — Antennæ of middle length; second and third joints uncommonly long; fourth and fifth joints completely fused, about twice as long as the sixth joint.

Chelipeds (fig. 5b) moderately strong. Basal joint somewhat more than half as long as the carpus, with the posterior protuberance deep but short, its hind margin free and rounded and reaching somewhat behind the front lower angle of second thoracic segment. Carpus somewhat long, slightly more than twice as long as deep, with the lower margin distinctly convex. Chela as long as the carpus, slightly more than twice as long as broad, with the hind margin somewhat concave; movable finger somewhat short, very much shorter than the anterior margin of the hand, moderately strong; fixed finger with a single long seta on the posterior margin at its base, and with a more proximal, triangular protuberance and a more distal triangular tooth on the incisive margin.

Thoracic segments, seen from above (fig. 5a), as to relative length and the shape of the lateral margins in the main similar to those in *S. cylindrata*. The lateral margins of the second segment are rather convex; the three anterior segments together a little shorter than fifth and sixth segments combined. — Thoracic legs of moderate length and thickness. The two anterior pairs (fig. 5b) have fourth and fifth joints subequal in length and proportionately short, together as long as the sixth joint, which is somewhat longer than seventh with claw, and on these legs the spines are very short or partly wanting. Three posterior pairs somewhat similar to those of thick-legged specimens of *S. cylindrata*.

Abdomen only as long as seventh, sixth, fifth and half of the fourth thoracic segments combined; sixth segment as long as the three preceding segments together, its posterior margin is somewhat convex with an obtuse median angle (fig. 5a). Pleopods proportionately long (fig. 5c); the exopod much longer than the peduncle and somewhat longer than the endopod; the terminal setæ longer than the rami. — Uropods not much more than half as long as sixth segment, moderately robust (fig. 5c); peduncle short and thick, much deeper than long; endopod with the proximal joint twice as long as the distal; exopod about half as long as and much thinner than the proximal joint of the endopod.

Length of the single specimen 1.05 mm.

Female (without marsupium). As the single specimen is so curved that I did not venture to make an attempt to straighten it, the description of the species has been based on the subadult male, and some remarks on the female may be added.

The specimen is rather similar to the male in most respects, but differs in some minor particulars. As far as can be judged the specimen is somewhat more slender in proportion to length than the subadult male.

The carapace is considerably shorter than the three following segments combined. — The antennulæ (fig. 5d) are somewhat longer than the carapace, slender; the first joint is three times as long as deep; fourth joint is distinctly shorter than the second. — Chelipeds with the carpus about half as long again as the basal joint and nearly twice as long as deep; chela somewhat more than twice as long as broad, with the movable finger proportionately a little longer than in the male; the

two protuberances on the incisive margin of the fixed finger are well developed, and when the fingers are closed a row of three oblong holes are seen between them.

Abdomen proportionately as long as in the male, but the sixth segment is longer, being even slightly longer than the sum of fifth, fourth, third and half of the second abdominal segment.

Length 1.25 mm.

Occurrence. This species has been taken by the "Ingolf" at two deep stations in the warm area.

Davis Strait: St. 24: Lat. 63°06' N., Long. 56°00' W., 1199 fm., temp. 2.4°; 1 female.

South of Iceland: St. 64: Lat. 62°06' N., Long. 19°00' W., 1041 fm., temp. 3.1°; 1 subadult male.

Distribution. This tiny species is easily separated from *S. cylindrata*. It is the smallest species hitherto known from the North Atlantic and probably smaller than any species hitherto described.

### ***Strongylurella* n. gen.**

Allied to *Strongylura*, but differing in the following characters.

The thoracic segments as to relative length as in *Leptognathia*, consequently differing from *Strongylura* in having the three anterior segments combined conspicuously longer than the fifth and sixth segments combined. The last abdominal segment shorter than in *Strongylura* and longer than in *Leptognathia*, being slightly longer than broad. The uropods have the endopod divided as in *Strongylura*, as its proximal joint is much longer than the distal, but the exopod is wanting.

Remarks. It was found necessary to establish this new genus on a single species which differs materially from *Leptognathia*, *Strongylura* and allied genera.

### **75. *Strongylurella indivisa* n. sp.**

(Pl. XII, figs. 2a—2e.)

Female (without marsupium). Body very slender (fig. 2a), about eight and a half times as long as broad, broadest behind the middle of the carapace and thence tapering slightly to the base of the abdomen. — Carapace large (fig. 2a), even a little longer than the two following segments combined, considerably longer than broad, at the front end scarcely half as broad as behind the middle and with the lateral margins evenly and moderately convex.

Antennulæ (fig. 2b) somewhat shorter than the carapace, shaped nearly as in *Strongylura cylindrata*. First joint a little shorter than the three other joints combined, two and a half times as long as deep, but only a little deeper before the base than at the distal end. Second joint considerably produced above, a little less than half as long as the first and distally thicker than at the base; third joint moderately large and distinctly longer than deep; fourth joint conspicuously longer than the third and shorter than the second. — Antennæ moderately short; fourth and fifth joints completely fused, about two and a half times longer than the sixth joint.

Chelipeds moderately robust (fig. 2b). The basal joint is somewhat shorter than the carpus,

its posterior protuberance somewhat long, longer than deep, with the rounded hind margin situated considerably before the front lower angle of second thoracic segment. Carpus a little more than half as long again as deep, with the upper margin very convex, the free part of the lower margin feebly convex. Chela considerably longer than the carpus, a little more than twice as long as broad, with two strong setæ on the posterior margin, which is distinctly convex between the distal of these setæ and the base; movable finger considerably shorter than the anterior margin of the hand, somewhat robust; when the fingers are adduced a triangular, oblong hole is seen between their proximal parts, while the subdistal part of the incisive margin of the fixed finger is rather convex.

Thoracic segments (fig. 2a) taper slightly in breadth from second to seventh segment; their lateral margins are feebly convex or nearly straight and a little curved at both ends. Second segment a little shorter than the third which is somewhat shorter than the fifth. — Thoracic legs somewhat short. The two anterior pairs (fig. 2b) are moderately strong, with sixth joint long, somewhat shorter than fourth and fifth joints combined and considerably longer than seventh with claw; most of their spines short. The three posterior pairs rather slender (fig. 2c); their sixth joint about as long as the fifth but much shorter than seventh joint with claw; seventh joint and claw subequal in length.

Abdomen as long as seventh, sixth, fifth and half of the fourth thoracic segment combined (fig. 2a). Five anterior segments with the ventral line straight (fig. 2d). Pleopods wanting. Sixth segment distinctly shorter than the three preceding segments combined (figs. 2d and 2e); its lateral margins somewhat long and straight, while each half of the posterior margin is considerably concave, as the median half of the segment is produced posteriorly into a triangle about twice as broad as long and with the end acute (fig. 2d). — Uropods as long as the straight lateral margin of the last abdominal segment, moderately strong; peduncle, seen from the side (fig. 2e), oblong rectangular; endopod twice as long as the peduncle, with its proximal joint slightly less than twice as long as the distal joint; exopod completely wanting.

Length of the single specimen 1.7 mm.

Remarks. *S. indivisa* is easily distinguished from all other species mentioned in this paper by having a well developed and two-jointed endopod but no exopod on the uropods; furthermore the shape of the last abdominal segment is very characteristic.

Occurrence. Taken by the "Ingolf" at the following station.

South-West of Iceland: St. 78: Lat. 60° 37' N., Long. 27° 52' W., 799 fm., temp. 4.5°; 1 spec.

### Paranarthrura n. gen.

Description. As to general aspect somewhat similar to *Leptognathia*. The body tapers considerably from the posterior part of the carapace or the front part of second segment to the abdomen. — Antennulæ four-jointed and shaped as in *Leptognathia*. Antennæ with fourth and fifth joints completely fused. — Mouth-parts (examined only in *P. insignis*) somewhat aberrant; the labrum (Pl. XII, fig. 3c) is produced in a somewhat long, distally obtuse triangle; the mandibles (figs. 3c and 3d) are somewhat long, without molar process, curved inwards far beyond the middle, and the

incisive margin of the right mandible has few and obtuse teeth, while that of the left mandible is somewhat incised and the movable lobe moderately developed. The maxillulæ are very slender (fig. 3e); the maxillipeds (fig. 3f) have their proximal unpaired part long, the lobes are well separated to their base and each has two short setæ at the terminal margin.

The thoracic segments have the lateral margins conspicuously angular and the anterior segments as to length developed as in *Leptognathia*. The thoracic legs shaped as in the last-named genus.

Abdomen in the female very short (figs. 3a and 4a); its five anterior segments combined at most as long as seventh thoracic segment, considerably narrower than this segment and somewhat narrower than sixth abdominal segment, which is broader than long and posteriorly somewhat produced. Pleopods wanting. Uropods short, with the exopod either unjointed or not marked off, the endopod one-jointed or two-jointed. — In the subadult male the five anterior abdominal segments are somewhat longer than in the female and their pleopods are moderately long, but terminal setæ are either somewhat short (fig. 3m) or quite wanting (fig. 5c). — (Adult males unknown).

Remarks. This genus differs from all preceding genera with four-jointed antennulæ in having the five anterior abdominal segments much reduced both in length and breadth; in the female of the genus *Anarthrura* G. O. S. the abdomen is also much reduced in length, but all segments are fused so that not even a vestige of a division into segments is visible. Furthermore, in *Anarthrura* the coxal joint of the chelipeds is, according to Sars' figure, developed as a free, outstanding joint different from the structure found in any species of *Paranarthrura*. Finally, the abdomen in the subadult male of *Anarthrura* is according to Sars much more developed than in *Paranarthrura* (I consider the male of *Anarthrura* figured by Sars to be not adult but in all probability only subadult, because its antennulæ contain only five joints as in subadult males of several species of *Leptognathia*, and because the thoracic segments and their legs do not differ materially from those in the female.)

Three new species secured by the "Ingolf" in the warm area are referred to this new genus. These species differ materially from each other in several particulars.

76. ***Paranarthrura insignis*** n. sp.

(Pl. XII, figs. 3a—3m.)

Female. Moderately slender (fig. 3a), almost seven times as long as the breadth of the carapace somewhat before its hind margin and tapering considerably backwards. — Carapace large, as long as the two following segments combined (fig. 3a), somewhat longer than broad, somewhat behind the middle more than two and a half times as broad as at the insertion of the antennulæ and thus nearly pear-shaped.

Antennulæ a little or somewhat shorter than the carapace, rather slender (fig. 3b). First joint uncommonly long, somewhat longer than the three other joints combined, nearly three and a half times as long as deep, but considerably deeper somewhat from the base than somewhat beyond the middle. Second joint distinctly produced above, as deep as the distal part of the first joint but slightly more than one-third as long as that joint; third joint distinctly longer than deep; fourth joint somewhat shorter than the second. — Antennæ slender and moderately short.



Chelipeds moderately strong (fig. 3b). Basal joint short, somewhat deeper than long, without any posterior protuberance, as its whole posterior margin is oblique and inserted on a very large, well defined coxal area; the hind margin of the joint is very remote from the front lower end of second thoracic segment. Carpus twice or more than twice as long as deep, peculiarly shaped; the lower margin has a very low protuberance with two small setae at the middle and behind and beyond this protuberance the margin is feebly concave; the upper proximal part of the joint is somewhat produced backwards. Chela somewhat longer than the carpus and a little more than twice as long as broad; the movable finger somewhat robust, as long as or slightly longer than the anterior margin of the hand, which is conspicuously but more or less irregularly arcuate; the posterior margin of the chela is sinuate, showing three concave or flatly incised places (figs. 3b and 3l — the last figure drawn from a subadult male); the incisive margin of the fixed finger has a sharp tooth somewhat from the end.

Thoracic segments, seen from above (fig. 3a), peculiarly shaped and increasing somewhat in length from the second to the sixth. Second segment, which is slightly narrower than the carapace, is considerably broader anteriorly than behind, with the lateral margins converging considerably backwards. Third to seventh segment on each lateral margin with a rounded protuberance, which on the third segment is situated somewhat before the middle, on the following segments gradually more backwards; the front half of each lateral margin of the three posterior segments is conspicuously convex. In specimens without marsupium (fig. 3b) each segment has on the ventral side a moderately long, slender, acute process; on second segment this process is situated near the front end, on the following segments gradually more backwards, on seventh segment (fig. 3h) somewhat or a little before the middle; the anterior processes (fig. 3b) are curved much forwards, while on the posterior segments they are directed more downwards (fig. 3h); in females with marsupium the processes of second to sixth segments are lost, but the process on seventh segment is preserved. — Thoracic legs (figs. 3b and 3g) rather slender, decreasing in length from second pair, which are somewhat long, to seventh pair, which are somewhat short; most of the spines on the legs are somewhat long. Second pair with fourth and fifth joints rather long, sixth joint somewhat longer than the fifth and about as long as seventh joint with claw; the spine on the anterior angle of fifth joint long. Seventh pair (fig. 3g) with sixth joint a little or slightly shorter than fifth joint and somewhat shorter than seventh joint together with the fine, curved claw.

Abdomen very short. Five anterior segments, when straightened (fig. 3i), together a little or somewhat shorter and much narrower than seventh thoracic segment. Sixth segment, seen from above (fig. 3i), a little longer than the three preceding segments combined, much broader than long and somewhat broader than the fifth segment, posteriorly at the middle distinctly triangularly produced; the lateral margins very convex. — Uropods about as long as, or a little longer than, sixth segment, robust; exopod not marked off and directed essentially downwards (fig. 3h), being an oblong, triangular protuberance from the distal angle of the peduncle and longer than the peduncle itself, which is at least as long as deep; endopod two-jointed, with the first joint distinctly shorter than the second.

Length of a large female without marsupium 2.9<sup>mm</sup>, of females with marsupium 2.6—2.8<sup>mm</sup>.

Subadult Male. It differs from full-grown females without marsupium in three features

The antennulæ (fig. 3k) are considerably thicker; the first joint somewhat or rather considerably shorter than the three other joints combined and only a little more than two and a half times as long as deep; second joint considerably produced above; fourth joint nearly as long as the second and thickened, especially at the base. The five anterior abdominal segments (fig. 3m) are much longer than in the female, together about twice as long as seventh thoracic segment. The pleopods are somewhat large, with the rami much longer than the peduncle, but the terminal setæ are slightly more than half as long as the rami and somewhat thick.

Smaller than the females, measuring only 2.2—2.3<sup>mm</sup>.

Remarks. *P. insignis* is a fine form which is abundantly distinguished from the two following species by possessing ventral thoracic processes, by the shape of the thoracic segments, the chelipeds and above all by the uropods.

Occurrence. It has been taken by the "Ingolf" at three stations.

Davis Strait: St. 32: Lat. 66° 35' N., Long. 56° 38' W., 318 fm., temp. 3.9°; 1 spec.

— — St. 25: Lat. 63° 30' N., Long. 54° 25' W., 582 fm., temp. 3.3°; more than a hundred specimens.

— — St. 24: Lat. 63° 06' N., Long. 56° 00' W., 1199 fm., temp. 2.4°; 6 spec.

#### 77. *Paranarthrura subtilis* n. sp.

(Pl. XII, figs. 4a—4d.)

Female (without marsupium). Rather slender (fig. 4a), about seven and a half times as long as broad a little behind the front end of second thoracic segment and tapering considerably backwards. — Carapace as long as the second and half of the third segment combined — these segments are long —, somewhat longer than broad, not fully twice as broad at the middle as at the front end and with the lateral margins moderately convex.

Antennulæ much shorter than the carapace (fig. 4b), somewhat thick. First joint subcylindrical and somewhat more than twice as long as deep; second joint scarcely produced above and half as long as the first; third joint a little longer than deep; fourth joint scarcely as long as the second. — Antennæ short, a little more than half as long as the antennulæ.

Chelipeds (fig. 4b) somewhat slender. Basal joint short, about as long as deep, without posterior protuberance, but attached by the whole oblique hind margin, which is situated a little behind the middle of the cephalothorax. Carpus two and a half times as long as deep, with the upper proximal part produced backwards, the major part of the upper margin nearly straight and the lower margin a little sinuate. Chela scarcely as long as the carpus, somewhat slender, being two and a half times as long as broad; the movable finger as long as the front margin of the hand, moderately robust; the posterior margin is a little concave at the middle, where a single seta is inserted; the end of both fingers very acute.

Thoracic segments (fig. 4a) with the lateral margins very conspicuously angular; the angles, which on second segment are near the front end, are on the following segments placed gradually more backwards, on seventh segment somewhat from the posterior end; the margins between the acute

or somewhat rounded angles and both ends of each segment are straight. Third, fourth, fifth and sixth segments subequal in length, while second and seventh segments are somewhat shorter. No ventral processes are found. — Thoracic legs (figs. 4b and 4c) moderately short, and all subequal in length and moderately slender; the relative length of the joint almost as in *P. insignis*, but the spines on the anterior pairs are much shorter than in that species.

Abdomen very short (fig. 4a). Five anterior segments combined scarcely as long as and considerably narrower than seventh thoracic segment (fig. 4d). Sixth segment about as long as the four preceding segments combined and somewhat broader than the fifth segment; each half of its posterior margin is considerably concave, as the median third of the segment is produced backwards in a triangle with the end nearly acute. — Uropods robust and somewhat shorter than the sixth segment; the peduncle longer than deep (fig. 4c), with the outer distal angle a little produced as a small rudiment of an exopod not marked off; the endopod unjointed, slightly longer than the peduncle.

Length of the largest specimen 1.9<sup>mm</sup>.

Remarks. *P. subtilis* is easily distinguished from all other Tanaidæ with four-jointed antennulæ described in this paper by its uropods. The antennulæ are unusually thick and shaped as in subadult males of allied forms, but as no pleopods are found the specimens must be females.

Occurrence. Taken by the "Ingolf" at a single station.

Davis Strait: St 32: Lat. 66° 35' N., Long. 56° 38' W., 318 fm., temp. 3.9°; 7 spec.

#### 78. *Paranarthrura clavipes* n. sp.

(Pl. XII, figs. 5a—5c.)

Immature Male and juvenile Specimen. Body, seen from above (fig. 5a), moderately slender, broadest across the carapace and tapering much backwards to the abdomen. — Carapace large (fig. 5a), somewhat shorter than the two following segments combined — which are uncommonly long —, somewhat longer than broad and broadest a little before the middle, which is nearly more than twice as broad as the front end, and consequently the lateral margins are very convex.

Antennulæ (fig. 5b) much shorter than the carapace. First joint a little longer than the three other joints combined and in the immature male two and a half times as long as deep; second joint somewhat produced above and not half as long as the first joint; third joint quite short; fourth joint considerably shorter than the second. — Antennæ of moderate length; the joint composed by the fusion of fourth and fifth joints is very long, while the penultimate joint is unusually short.

Chelipeds (fig. 5b) moderately strong. The basal joint is considerably longer than deep, posteriorly produced in a protuberance which is narrowly rounded behind, and the distance between its end and the front lower angle of second thoracic segment is a little more than half as long as the joint itself. Carpus slightly more than half as long again as the basal joint, somewhat more than twice as long as deep, with the upper basal part somewhat produced backwards; most of the upper margin and nearly the whole free lower margin are straight and slightly converging. Chela slightly longer than the carpus, almost two and a half times as long as broad, regularly shaped with the fingers acute; the posterior margin almost straight with a single seta; the movable finger slightly shorter than the anterior margin of the hand.

Thoracic segments, seen from above (fig. 5a), in the main as in *P. subtilis*, but more tapering than in this species; the lateral margins are sharply angular; second segment is unusually long, only a little shorter than the third, which is as long as the fourth or the fifth. — Second and third pairs of thoracic legs (fig. 5b) somewhat long and slender, with the spines thin and moderately or very short; fifth joint conspicuously longer than the fourth; sixth joint only a little shorter than fourth and fifth joints combined and considerably longer than the seventh joint with claw. Three posterior pairs (fig. 5c) only a little shorter than second pair; second joint is clavate, being very thin towards the base while the distal part is thick; sixth joint is somewhat longer and considerably thinner than the robust fifth joint and somewhat longer than the seventh joint with claw.

Abdomen in general shape somewhat similar to that of *P. subtilis*. As the seventh thoracic segment is only half developed — having no legs — in the juvenile specimen shown in fig. 5a, the length of the abdomen must in this figure be compared not with seventh but with sixth thoracic segment. In the immature male (fig. 5c) the five anterior segments combined are nearly half as long again as seventh thoracic segment; the pleopods are of moderate size, with the exopod longer than the peduncle, but both rami completely without setæ. In the immature male the sixth abdominal segment is not quite as long as the three preceding segments combined; in the juvenile specimen it is even longer than the four preceding segments combined; it is a little less broad in proportion to length than in *P. subtilis*, and the produced part between the uropods is not triangular but rounded. — Uropods considerably shorter than the sixth segment; the peduncle is much shorter than deep (fig. 5c); the endopod two-jointed, with the second joint much longer than the first; the exopod is well marked off, one-jointed, a little more than half as long as, and much thinner than, the endopod.

Length of the immature male 2.15 mm, of the juvenile specimen 1.7 mm.

Remarks. In the structure of the uropods and the posterior protuberance on the basal joint of the chelipeds *P. clavipes* is sharply distinguished from the two preceding species. The clavate shape of the second joint of the three posterior pairs of thoracic legs is also very characteristic.

Occurrence. Taken by the "Ingolf" at the deepest of its stations.

South of the Davis Strait: St. 38: Lat. 59° 12' N., Long. 51° 05' W., 1870 fm., temp. 1.3°; 2 spec. (1 immature male and 1 juvenile specimen).

## EXPLANATION OF THE PLATES.

## Plate I.

Fig. 1. *Apseudes vicinus* n. sp.

- Fig. 1a. Body of the single specimen, an immature female, from above;  $\times 21$ .  
 — 1b. Left cheliped, from the outer side;  $\times 32$ .  
 — 1c. Left second thoracic leg, from the outer side;  $\times 32$ .

Fig. 2. *Apseudes tenuis* n. sp.

- Fig. 2a. Cephalothorax and four thoracic segments of a subadult female from the "Ingolf" Stat. 24, from above;  $\times 13$ .  
 — 2b. Seventh thoracic segment and abdomen of the same specimen, from above;  $\times 13$ .  
 — 2c. Left cheliped of a subadult female, from the outer side;  $\times 24$ .  
 — 2d. Left second thoracic leg of the same specimen, from the outer side;  $\times 24$ .  
 — 2e. Left seventh thoracic leg of the same specimen, from the outer side;  $\times 24$ .

Fig. 3. *Apseudes gracilis* Norm. & Stebb.

- Fig. 3a. Cephalothorax and three thoracic segments of a subadult female, from above;  $\times 10$ .  
 — 3b. Left cheliped of the same specimen, from the outer side;  $\times 22$ .  
 — 3c. Distal half of the fixed finger of the chela of the cheliped shown in fig. 3b, from the outer side;  $\times 90$ .  
 — 3d. Left second thoracic leg of the same specimen, from the outer side;  $\times 22$ .

Fig. 4. *Apseudes gracillimus* n. sp.

- Fig. 4a. Cephalothorax and the major part of the thorax of a subadult female, from above;  $\times 10$ .  
 — 4b. Seventh thoracic segment and abdomen of the same specimen, from above;  $\times 10$ .  
 — 4c. Left cheliped of a subadult female, from the outer side;  $\times 23$ .  
 — 4d. Left second thoracic leg of the same specimen, from the outer side;  $\times 23$ .  
 — 4e. Left seventh thoracic leg of the same specimen, from the outer side;  $\times 23$ .

Fig. 5. *Heterotanais groenlandicus* n. sp.

- Fig. 5a. Female with marsupium, from above;  $\times 16$ .  
 — 5b. Carapace with antennulæ of the same specimen, from above;  $\times 35$ .  
 — 5c. Carapace and second thoracic segment with appendages of a female with marsupium, from the left side;  $\times 47$ .  
 — 5d. The fixed finger of the left chela of the same female, from the outer side;  $\times 94$ .  
 — 5e. Left third thoracic leg of the last-named female, from the outer side;  $\times 47$ .  
 — 5f. Left seventh thoracic leg of the last-named female, from the outer side;  $\times 47$ .  
 — 5g. End of abdomen with the left uropod of the same female, from the left side;  $\times 47$ .

Fig. 6. *Ncotanaïs serratispinosus* Norm. & Stebb.Fig. 6a. Left cheliped of an adult female, from the outer side;  $\times 23$ .-- 6b. Fingers of the cheliped shown in fig. 6a, from the outer side;  $\times 67$ .

## Plate II.

Fig. 1. *Ncotanaïs serratispinosus* Norm. & Stebb. (Continued).Fig. 1a. Terminal part of left third thoracic leg of an adult female, from the posterior side;  $\times 74$ .-- 1b. Terminal part of left sixth thoracic leg of the same female, from the posterior side;  $\times 74$ .-- 1c. Terminal part of left seventh thoracic leg of the same female, from above;  $\times 74$ .Fig. 2. *Ncotanaïs giganteus* n. sp.Fig. 2a. Adult male, from above;  $\times 3$ .-- 2b. Anterior part of the carapace with the right antennula of the male, from above;  $\times 8$ .-- 2c. Front end of the carapace with the ocular plate, the left antenna and the basal part of the left antennula, of the male, from the left side;  $\times 8$ .-- 2d. Left cheliped of the male, from the outer side;  $\times 8$ .-- 2e. Right second thoracic leg, from the posterior side;  $\times 33\frac{1}{4}$ .-- 2f. Terminal part of the leg shown in fig. 2e, from behind;  $\times 24$ .-- 2g. Terminal part of right seventh leg, obliquely from above and in front;  $\times 24$ .-- 2h. Last abdominal segment with the left uropod and the proximal part of the right uropod of the male, from above; scarcely  $\times 7$ .Fig. 3. *Pseudotanaïs forcipatus* Lilljeborg.Fig. 3a. Body of an adult male, from above;  $\times 36$ .-- 3b. Cephalothorax and the two anterior free thoracic segments with appendages of the adult male, from the left side;  $\times 81$ .3c. Front end of the carapace with the antennulæ of the adult male, from above;  $\times 81$ .-- 3d. Left seventh thoracic leg of the adult male, from the outer side;  $\times 81$ .-- 3e. Three posterior abdominal segments with the uropods of an adult male, from above;  $\times 81$ .4. *Pseudotanaïs abyssii* n. sp.Fig. 4a. Female with the marsupium not half developed, from the left side;  $\times 49$ .-- 4b. Body of a female with the marsupium fully developed, from above;  $\times 36$ .-- 4c. Front end of the carapace with left antennula and antenna of the adult female, from the left side;  $\times 98$ .4d. Left cheliped of an immature female, from the outer side;  $\times 98$ .4e. Right second thoracic leg of an adult female, from the outer side;  $\times 91$ . The articulation between fourth and fifth joint erroneously omitted.4f. Left third thoracic leg of an immature female, from the outer side;  $\times 98$ .-- 4g. Right fifth thoracic leg of an immature female, from the outer side;  $\times 98$ .

- Fig. 4h. Left first pleopod of an adult female, from behind;  $\times 94$ .  
 — 4i. Right uropod of an adult female, from above;  $\times 145$ .

Fig. 5. *Pseudotanaïs Lilljeborgii* G. O. Sars.

- Fig. 5a. Carapace with right antennula and half of left antennula of an ovigerous female, from above;  $\times 45$ .  
 — 5b. Carapace with left antennula and half of the right antennula of an adult male, from above;  $\times 45$ .  
 — 5c. Cephalothorax and the two anterior free thoracic segments with appendages of the adult male, from the left side;  $\times 61$ .  
 — 5d. Four posterior abdominal segments and uropods of the adult male, from above;  $\times 57$ .  
 — 5e. Left seventh thoracic leg of the adult male, from the outer side;  $\times 61$ .  
 — 5f. Distal part of the leg shown in fig. 5e, from the outer side,  $\times 146$ .  
 — 5g. Distal part of seventh thoracic leg of a subadult male, from the outer side;  $\times 146$ .

Fig. 6. *Pseudotanaïs oculatus* n. sp.

- Fig. 6a. Distal part of left cheliped of a not fully adult female, from the outer side;  $\times 78$ .  
 — 6b. Left second and third thoracic legs of a not fully adult female, from the outer side;  $\times 78$ .  
 — 6c. Left fourth thoracic leg of the same female, from the outer side;  $\times 78$ .  
 — 6d. Left seventh thoracic leg of the same female, from the outer side;  $\times 78$ .

### Plate III.

Fig. 1. *Pseudotanaïs oculatus* n. sp. (Continued).

- Fig. 1a. Body of a female with the marsupial lamella small, from above;  $\times 24$ .  
 — 1b. Female with the marsupial lamella small, from the left;  $\times 25$ .  
 — 1c. Front end of carapace with ocelli and left antennula and antenna of the female shown in fig. 1b, from the left side;  $\times 78$ .  
 — 1d. Right uropod of the female shown in fig. 1a, from above;  $\times 85$ .

Fig. 2. *Pseudotanaïs affinis* H. J. Hansen.

- Fig. 2a. Carapace with left antennula of a female with marsupium from the Kara Sea, from above;  $\times 33$ .  
 — 2b. Left antennula of the adult female from the Kara Sea, from the outer side;  $\times 70$ .  
 — 2c. Right uropod of the adult female from the Kara Sea, from above;  $\times 83$ .  
 — 2d. Left antennula and antenna of a female without marsupium from the "Ingolf" Stat. 103; from the outer side;  $\times 56$ .  
 — 2e. Left chela of the same female from the "Ingolf" Stat. 103, from the outer side;  $\times 56$ .  
 — 2f. Left second thoracic leg of the same female from the "Ingolf" St. 103, from the outer side;  $\times 56$ .  
 — 2g. Left third thoracic leg of the same "Ingolf" specimen, from the outer side;  $\times 56$ .  
 — 2h. Left seventh thoracic leg of the same "Ingolf" specimen, from the outer side;  $\times 56$ .

- Fig. 2i. Distal part of left third leg shown in fig. 2g, from the outer side;  $\times 130$ .  
 — 2k. Left antennula and antenna of a female without marsupium belonging to the variety from the "Ingolf" Stat. 25, from the outer side;  $\times 82$ .  
 2l. Left antennula and antenna of a subadult male from the "Ingolf" Stat. 119, from the outer side;  $\times 52$ .  
 — 2m. Left chela of an immature male from the "Ingolf" Stat. 119, from the outer side;  $\times 52$ .  
 — 2n. Left antennula and antenna of a subadult male of the variety from the "Ingolf" Stat. 25, from the outer side;  $\times 82$ .  
 — 2o. Left sixth thoracic leg of a subadult male from the "Ingolf" Stat. 119, from the inner side;  $\times 52$ .

Fig. 3. ?*Pseudotanaïs affinis* H. J. H.; adult Male.

- Fig. 3a. Cephalothorax and second thoracic segment with appendages of the male from the "Ingolf" Stat. 124, from the left side;  $\times 80$ .  
 — 3b. Four posterior abdominal segments and uropods of the same male, from above;  $\times 80$ .

Fig. 4. *Pseudotanaïs longipes* n. sp.

- Fig. 4a. Female with the marsupial lamellæ quite small, from the left;  $\times 35$ .  
 4b. Anterior part of the body of the not quite full-grown female, from above;  $\times 35$ .  
 — 4c. Left antennula and antenna of the female shown in fig. 4a, from the outer side;  $\times 55$ .  
 4d. Left chela of the same immature female, from the outer side;  $\times 63$ .  
 — 4e. Left second thoracic leg of the same immature female, from the outer side;  $\times 63$ .  
 — 4f. Left third thoracic leg of the same immature female, from the outer side;  $\times 63$ .  
 — 4g. Distal part of the left fourth thoracic leg of the same female, from the outer side;  $\times 100$ .  
 — 4h. Left seventh thoracic leg of the same immature female, from the outer side;  $\times 61$ .  
 — 4i. Right uropod of an immature female, from above;  $\times 84$ .

Fig. 5. *Typhlotanaïs irregularis* n. sp.

- Fig. 5a. Female, from above;  $\times 31$ .  
 5b. Cephalothorax and the two anterior free thoracic segments of a female without marsupium from the "Ingolf" Stat. 117, from the left side;  $\times 73$ .  
 5c. Left chela of the specimen shown in fig. 5b, from the outer side;  $\times 128$ .  
 5d. Left seventh thoracic leg of the same female, from the inner side;  $\times 73$ .  
 — 5e. Last abdominal segment with left uropod of the same female, from the left;  $\times 73$ .

Fig. 6. *Typhlotanaïs macrocephala* n. sp.

- Fig. 6a. The type-specimen, from above;  $\times 43$ .  
 — 6b. Cephalothorax and the two anterior free thoracic segments of the single specimen, from the left;  $\times 85$ .  
 — 6c. Second and third thoracic segments, from above;  $\times 84$ .  
 — 6d. Left seventh thoracic leg, from the outer side;  $\times 85$ .  
 — 6e. Last abdominal segment with left uropod, from the left;  $\times 110$ .



## Plate IV.

Fig. 1. *Typhlotanais pulcher* n. sp.

- Fig. 1a. The single specimen (without marsupium), from above;  $\times 21$ .  
 — 1b. Cephalothorax with antennulæ, from above;  $\times 45$ .  
 — 1c. Cephalothorax and second thoracic segment with appendages, from the left side;  $\times 60$ .  
 — 1d. Left third thoracic leg, from the outer side;  $\times 60$ .  
 — 1e. Left fifth thoracic leg, from the outer side;  $\times 60$ .  
 — 1f. Left seventh thoracic leg, from the outer side;  $\times 60$ .  
 — 1g. Left uropod, from above;  $\times 88$ .

Fig. 2. *Typhlotanais gracilipes* n. sp.

- Fig. 2a. Anterior part of the body with antennulæ of the female without marsupium;  $\times 44$ .  
 — 2b. Carapace and anterior thoracic segments with appendages, from the left side;  $\times 63$ .  
 — 2c. Left fourth thoracic leg, from the outer side;  $\times 63$ .  
 — 2d. Right sixth thoracic leg, from the inner side;  $\times 122$ .  
 — 2e. End of abdomen with the mutilated left uropod — the endopod wanting — from above;  
 $\times 132$ .

Fig. 3. *Typhlotanais mucronatus* n. sp.

- Fig. 3a. Body of a female without marsupium (from the "Ingolf" Stat. 120), from above;  $\times 20$ .  
 — 3b. Carapace with antennulæ of the specimen shown in fig. 3a, from above;  $\times 37$ .  
 — 3c. Cephalothorax and two anterior free thoracic segments with appendages of a female without marsupium from the "Ingolf" Stat. 119, from the left side;  $\times 48$ .  
 — 3d. Left chela of the female shown in fig. 3c, from the outer side;  $\times 96$ .  
 — 3e. Left sixth thoracic leg of the last-named female, from the outer side;  $\times 48$ .  
 — 3f. Distal half of the leg shown in fig. 3e, from the outer side;  $\times 90$ .  
 — 3g. Last abdominal segment with left uropod of the last-named female, from the left side;  $\times 57$ .  
 — 3h. Left antennula and antenna of a subadult male from the "Ingolf" Stat. 120, from the left side;  $\times 48$ .

Fig. 4. *Typhlotanais eximius* n. sp.

- Fig. 4a. Immature, somewhat contracted female, from above;  $\times 35$ .  
 — 4b. Cephalothorax and the two anterior free segments with appendages of the largest female without marsupium, from the left side;  $\times 80$ .  
 — 4c. Seventh right thoracic leg of the last-named female, from the outer side;  $\times 80$ .  
 — 4d. Right uropod of the specimen shown in fig. 4a, from above;  $\times 88$ .  
 — 4e. Cephalothorax and two anterior free segments with appendages of the immature male, from the left side;  $\times 77$ .  
 — 4f. Left sixth thoracic leg of the immature male, from the outer side;  $\times 77$ .  
 — 4g. Last abdominal segment with left uropod of the immature male;  $\times 77$ .

Fig. 5. *Typhlotanais penicillatus* G. O. Sars.

- Fig. 5a. Cephalothorax and anterior free segments with appendages of a female without marsupium, from the left side;  $\times 80$ .
- 5b. Left sixth thoracic leg of the same female, from the outer side;  $\times 80$ .
- 5c. Last abdominal segment with left uropod of the same female, from the left side;  $\times 80$ .
- 5d. Left antennula of an immature male, from the outer side;  $\times 80$ .

Fig. 6. *Typhlotanais inermis* n. sp.

- Fig. 6a. Body of a female without marsupium, from above;  $\times 22$ .
- 6b. Carapace with antennulae of the same female, from above;  $\times 42$ .
- 6c. Cephalothorax and anterior thoracic segments with appendages of a female without marsupium from the "Ingolf" Stat. 139, from the left side;  $\times 55$ .
- 6d. Left chela of the specimen shown in fig. 6c, from the outer side;  $\times 100$ .
- 6e. Left sixth thoracic leg of the female shown in fig. 6c, from the outer side;  $\times 55$ .
- 6f. Distal half of the leg shown in fig. 6e, from the outer side;  $\times 138$ .
- 6g. Right uropod of the specimen shown in fig. 6a, from above;  $\times 76$ .

Fig. 7. *Typhlotanais variabilis* n. sp.

- Fig. 7a. Female without marsupium from the "Ingolf" Stat. 102, from above;  $\times 22$ . The legs omitted.
- 7b. Left sixth thoracic leg of the adult female shown in fig. 2a on the next plate, from the outer side;  $\times 50$ .
- 7c. Major distal part of left seventh leg of the last-named female, from the outer side;  $\times 110$ .
- 7d. Left uropod of the last-named adult female, from the outer side;  $\times 50$ .

## Plate V.

Fig. 1. *Typhlotanais mucronatus* n. sp.

- Fig. 1a. Left antennula and antenna of a subadult male, from the outer side;  $\times 48$ . (This figure, which is found as fig. 3h on Pl. IV, has by an error in the arrangement been reproduced here again.)

Fig. 2. *Typhlotanais variabilis* n. sp. (Continued.)

- 2a. Cephalothorax and anterior thoracic segments of an adult female from the "Ingolf" Stat. 102, from the left side;  $\times 50$ . *p.* parasitic Copepod, measuring 0.1 mm in length.
- 2b. Left antennula and antenna of a female without marsupium from the "Ingolf" Stat. 105, from the outer side;  $\times 50$ .
- 2c. Cephalothorax and anterior thoracic segments with appendages of a subadult male from the "Ingolf" Stat. 105, from the left side;  $\times 55$ .

Fig. 3. *Typhlotanais tenuicornis* G. O. Sars.

- Fig. 3a. Left antenna, setae omitted, of a female from Norway (a co-type of G. O. Sars), from the outer side;  $\times 140$ .
- 3b. Major distal part of left second thoracic leg of a female from Norway, from the outer side;  $\times 140$ .
- 3c. Left third leg of the last-named female, from the outer side;  $\times 140$ .

Fig. 4. *Typhlotanais trispinosus* n.sp.

- Fig. 4a. Female without marsupium, from above;  $\times 21$ . The legs omitted.
- 4b. Cephalothorax and anterior thoracic segments with appendages of a female without marsupium, from the left side;  $\times 82$ .
- 4c. Left antenna of the last-named female, from the outer side;  $\times 140$ . The setae omitted.
- 4d. Major distal part of left second thoracic leg of the specimen shown in fig. 4b, from the outer side;  $\times 140$ .
- 4e. Right seventh thoracic leg of a female without marsupium, from the outer side;  $\times 205$ .
- 4f. Left uropod of the female shown in fig. 4b, from the outer side;  $\times 82$ .

Fig. 5. *Typhlotanais profundus* n.sp.

- Fig. 5a. Female without marsupium, from above;  $\times 21$ . The legs omitted.
- 5b. Left antennula of the same specimen, from above;  $\times 75$ .
- 5c. Left antennula and antenna of a female without marsupium, from the outer side;  $\times 78$ .
- 5d. Left uropod of a female without marsupium, from the outer side;  $\times 80$ .
- 5e. Cephalothorax and anterior thoracic segments with appendages of a subadult male, from the outer side;  $\times 78$ .

Fig. 6. *Typhlotanais spinicauda* n.sp.

- Fig. 6a. Cephalothorax and three anterior thoracic segments of the single specimen, a female without marsupium, from above;  $\times 30$ .
- 6b. Cephalothorax and anterior thoracic segments with appendages of the female without marsupium, from the left side;  $\times 45$ .
- 6c. Left antennula and antenna, from the outer side;  $\times 83$ .
- 6d. Distal half of left cheliped, from the outer side;  $\times 83$ .
- 6e. Left second thoracic leg, from the outer side;  $\times 83$ .
- 6f. Left third thoracic leg, from the outer side;  $\times 83$ .
- 6g. Right sixth thoracic leg, from the outer side;  $\times 83$ .
- 6h. Last abdominal segment with the uropods, from above;  $\times 60$ .

Fig. 7. *Typhlotanais grandis* n.sp.

- Fig. 7a. Body of the single specimen, probably an immature male, from above;  $\times 13$ .
- 7b. Cephalothorax and anterior thoracic segments with appendages of the specimen mentioned, from the side and somewhat obliquely from above;  $\times 38$ .
- 7c. Left seventh thoracic leg, from the outer side;  $\times 38$ .
- 7d. Major distal part of the leg shown in fig. 7c, from the outer side;  $\times 135$ .
- 7e. Last abdominal segment with left uropod, from the outer side;  $\times 54$ .

Fig. 8. *Typhlotanais plebejus* n.sp.

- Fig. 8a. Body of a female without marsupium, from above;  $\times 16$ .
- 8b. Left antennula and antenna of a female without marsupium, from the outer side;  $\times 58$ .
- 8c. Left cheliped of a female without marsupium, from the outer side;  $\times 58$ .

- Fig. 8d. Left second thoracic leg of a female without marsupium, from the outer side;  $\times 58$ .  
 — 8e. Left fourth thoracic leg of the same female, from the outer side;  $\times 58$ .  
 — 8f. Left fifth thoracic leg of the same female, from the outer side;  $\times 58$ .  
 — 8g. Last abdominal segment with left uropod of a female without marsupium, from the left side;  $\times 58$ .

Fig. 9. *Typhlotanais inaequipes* n. sp.

- Fig. 9a. Right seventh thoracic leg of a female without marsupium, from the outer side;  $\times 80$ .  
 — 9b. Left uropod of a female without marsupium, from the outer side;  $\times 80$ .

### Plate VI.

Fig. 1. *Typhlotanais inaequipes* (Continued.)

- Fig. 1a. Body of a female without marsupium, from above;  $\times 25$ .  
 — 1b. Right antennula of the same female, from above;  $\times 80$ .  
 — 1c. Cephalothorax and anterior thoracic segments with appendages of a female without marsupium, from the left side;  $\times 80$ .

Fig. 2. *Typhlotanais finmarchicus* G. O. Sars.

- Fig. 2a. Left antennula and antenna of a female without marsupium from the Sabine Island, from the left side;  $\times 84$ .  
 — 2b. Left uropod of the same female, from the outer side;  $\times 84$ .

Fig. 3. *Typhlotanais mixtus* n. sp.

- Fig. 3a. Body of a female without marsupium from the "Ingolf" Stat. 117, from above;  $\times 27$ .  
 — 3b. Cephalothorax and anterior thoracic segments of a female with marsupium (the marsupium itself omitted) from the "Ingolf" Stat. 117, from the left side;  $\times 82$ .  
 — 3c. Left antennula of a subadult male from the "Ingolf" Stat. 117, from the left side;  $\times 82$ .  
 — 3d. Second thoracic segment (left leg omitted) of a female without marsupium from the same station, from the left side;  $\times 82$ .  
 — 3e. Left sixth thoracic leg of the female shown in fig. 3b, from the outer side;  $\times 82$ .

Fig. 4. *Typhlotanais solidus* n. sp.

- Fig. 4a. The single specimen, a female without marsupium, from above;  $\times 21$ . Most of the appendages omitted.  
 — 4b. Carapace with antennulae, from above;  $\times 32$ .  
 — 4c. Cephalothorax with appendages, from the left side;  $\times 52$ .  
 — 4d. Left second and third thoracic legs, from the outer side;  $\times 52$ .  
 — 4e. Right seventh thoracic legs, from the outer side;  $\times 52$ .  
 — 4f. Last abdominal segment with right uropod, from above;  $\times 52$ .

Fig. 5. *Agathotanaia Ingolfs* n. gen., n. sp.

- Fig. 5a. Largest female without marsupium, from above;  $\times 15$ .  
 — 5b. Largest female without marsupium, from the left side;  $\times 16$ .  
 — 5c. Front end of the cephalothorax with left antennula and antenna of the last-named female, from the left side;  $\times 53$ .  
 — 5d. Both mandibles of a female without marsupium, from below;  $\times 93$ . *l.* left mandible.  
 — 5e. Paragnatha of the last-named female, from below;  $\times 93$ .  
 — 5f. Left maxillula of the last-named female, from below;  $\times 93$ .  
 — 5g. Maxillipeds, with the epipods omitted, of the last-named female, from below;  $\times 93$ .  
 — 5h. Left chela of the female shown in fig. 5b, from the outer side;  $\times 53$ .  
 — 5i. Left third thoracic leg of the female shown fig. 5b, from the outer side;  $\times 53$ .  
 — 5k. Left seventh thoracic leg of the last-named female, from the outer side;  $\times 53$ .  
 — 5l. Two posterior abdominal segments with left uropod of the last-named female, from the left side;  $\times 68$ .  
 — 5m. Two posterior abdominal segments with uropods of another female without marsupium, from below;  $\times 66$ .  
 — 5n. Front end of the head with left antennula and antenna of a subadult male, from the left side;  $\times 61$ .  
 — 5o. Posterior part of the thorax, seventh left thoracic leg and abdomen with pleopods and left uropod of a subadult male, from the left side;  $\times 36$ .

Fig. 6. *Leptognathia multiserrata* n. sp.

- Fig. 6a. Right antennula and antenna of a female without marsupium, from the outer side;  $\times 85$ .  
 — 6b. Carpus and chela of right cheliped of the same female, from the outer side;  $\times 85$ .  
 — 6c. Second right thoracic leg of the same female, from the outer side;  $\times 85$ .  
 — 6d. Sixth right thoracic leg of the same female, from the outer side;  $\times 85$ .  
 — 6e. Five posterior abdominal segments with the right uropod and the pleopod of fifth segment of the same female, from the outer side;  $\times 46$ . Pleopods of second, third and fourth segments omitted.

Fig. 7. *Leptognathia Sarsii* H. J. Hansen.

- Fig. 7a. Anterior part of the cephalothorax of a female from Klaksvig (Færoe Islands), from the outer side;  $\times 65$ .  
 — 7b. Left chela of another female from the same locality, from the outer side;  $\times 85$ .  
 — 7c. Left second thoracic leg of a third female from the same locality, from the outer side;  $\times 58$ .  
 — 7d. Left seventh thoracic leg of the last-named female, from the outer side;  $\times 58$ .  
 — 7e. Abdomen with left uropod and the pleopod of second segment of a female from the same locality, from the left side;  $\times 39$ . Four pleopods omitted in order to show the ventral protuberances.  
 — 7f. End of abdomen with left uropod — setae omitted — of another female from the same locality, from the left side;  $\times 55$ .

## Plate VII.

Fig. 7. *Leptognathia gracilis* Kröyer.

- Fig. 1a. Anterior part of the cephalothorax with appendages of a female, from the left side;  $\times 65$ .  
 — 1b. Left chela of a subadult male, from the outer side;  $\times 84$ .  
 — 1c. Distal part of left second thoracic leg of a female, from the outer side;  $\times 80$ .  
 — 1d. Left uropod of a female, from the outer side;  $\times 80$ .

Fig. 2. *Leptognathia Hansenii* Vanhöffen.

- Fig. 2a. Anterior part of the cephalothorax with appendages of a female from the mouth of the Ameralik Fjord, from the left side;  $\times 63$ .  
 — 2b. Left second thoracic leg of the same female, from the outer side;  $\times 76$ .  
 — 2c. Left sixth thoracic leg of the same female, from the outer side;  $\times 76$ .  
 — 2d. Five posterior abdominal segments with left fourth pleopod and left uropod of a female from the same locality, from the left side;  $\times 41$ .  
 — 2e. Left cheliped of a subadult male from the same locality, from the outer side;  $\times 76$ .  
 2f. Anterior part of the cephalothorax with appendages of an adult male from the mouth of the Ameralik Fjord, from the left side;  $\times 90$ .  
 — 2g. Major part of the left chela of the same male, from the outer side;  $\times 180$ .  
 — 2h. Distal part of the hand with the base of the fingers of the same chela, from the inner side;  $\times 170$ .  
 — 2i. Left second thoracic leg of the same male, from the outer side;  $\times 90$ .  
 — 2k. Major distal part of left seventh thoracic leg of the same male, from the outer side;  $\times 90$ .  
 — 2l. Posterior end of abdomen with left uropod of the same female, from the outer side;  $\times 90$ .

Fig. 3. *Leptognathia longicemis* Lilljeborg.

- Fig. 3a. Anterior part of the cephalothorax with appendages of a female without marsupium from the "Ingolf" Stat. 25, from the outer side;  $\times 62$ .  
 — 3b. Left second thoracic leg of the same female, from the outer side;  $\times 62$ .  
 3c. Distal part of left fifth thoracic leg of the same female, from the outer side;  $\times 62$ .  
 — 3d. Abdomen with left fourth pleopod and left uropod of the same female, from the left side;  $\times 40$ . The other pleopods omitted in order to show the ventral tubercles of the segments.  
 — 3e. End of abdomen with left uropod — setae omitted — of the same specimen, from the outer side;  $\times 92$ .

Fig. 4. *Leptognathia inermis* n. sp.

- Fig. 4a. Anterior part of the cephalothorax with appendages of an ovigerous female, from the "Ingolf" Stat. 115, from the left side;  $\times 86$ .  
 — 4b. Distal half of left cheliped of another female from the same station, from the outer side;  $\times 86$ .  
 — 4c. Left second thoracic leg of the specimen shown in fig. 4a, from the outer side;  $\times 86$ .  
 — 4d. Major distal part of left second thoracic leg of another female, from the outer side;  $\times 86$ .

- Fig. 4e. Left sixth thoracic leg of the female possessing the chela shown in fig. 4b, from the inner side;  $\times 86$ .
- 4f. Abdomen with second and fifth left pleopods and left uropod of the female shown in fig. 4a, from the left side;  $\times 82$ .
- 4g. Left cheliped of a female from Cape Dalton, from the left side;  $\times 84$ . The movable finger differs from that in specimens from other localities (figs. 4a and 4b) in having three feeble indentations on the anterior margin.

Fig. 5. *Leptognathia brachiata* n. sp.

- Fig. 5a. Carapace with antennulae and second thoracic segment of a female without marsupium from the "Ingolf" Stat. 25, from above;  $\times 35$ .
- 5b. Cephalothorax and second thoracic segment with appendages of a female with marsupium from the "Ingolf" Stat. 25, from the left side;  $\times 47$ .
- 5c. Left antennula and antenna of the last-named specimen, from the outer side;  $\times 85$ .
- 5d. Left cheliped of the last-named specimen, from the outer side;  $\times 85$ .
- 5e. Left second thoracic leg of a female without marsupium from the same station, from the outer side;  $\times 85$ .
- 5f. Left sixth thoracic leg of the last-named female, from the outer side;  $\times 85$ .
- 5g. Three posterior abdominal segments of the specimen mentioned at fig. 5a, from above;  $\times 46$ .
- 5h. Abdomen with appendages of a female with marsupium from the "Ingolf" Stat. 25, from the left side;  $\times 46$ .

Fig. 6. *Leptognathia alba* n. sp.

- Fig. 6a. Left antennula and antenna of the single specimen, from the outer side;  $\times 55$ .
- 6b. Left cheliped, from the outer side;  $\times 85$ .
- 6c. Left second thoracic leg, from the outer side;  $\times 58$ .
- 6d. Left seventh thoracic leg, from the outer side;  $\times 58$ .
- 6e. Abdomen with left fifth pleopod and left uropod, from the outer side,  $\times 33$ . The other pleopods omitted in order to show the characteristic ventral tubercles.

Fig. 7. *Leptognathia hastata* n. sp.

- Fig. 7a. Left antennula and antenna of a female without marsupium from the "Ingolf" Stat. 102, from the outer side;  $\times 62$ .
- 7b. Left cheliped of the same specimen, from the outer side;  $\times 62$ .
- 7c. Left second thoracic leg of the same specimen, from the outer side;  $\times 88$ .
- 7d. Left fifth thoracic leg of the same specimen, from the outer side;  $\times 88$ .
- 7e. Distal part of left seventh thoracic leg of the same specimen, from the outer side;  $\times 172$ .
- 7f. Abdomen with left first and fifth pleopods and left uropod (with the setae omitted) of the same specimen, from the left side;  $\times 40$ .
- 7g. End of abdomen with left uropod of the same specimen, from the outer side;  $\times 65$ .
- 7h. Three posterior segments of the abdomen and left uropod — the setae omitted — of another female without marsupium from the "Ingolf" Stat. 102, from the left side;  $\times 40$ .

## Plate VIII.

Fig. 1. *Leptognathia armata* n. sp.

- Fig. 1a. Left antennula and antenna of a subadult male from the "Ingolf" Stat. 36, from the outer side;  $\times$  59.
- 1b. Left cheliped of the same subadult male, from the outer side;  $\times$  59.
  - 1c. Left second thoracic leg of the same subadult male, from the outer side;  $\times$  59.
  - 1d. Distal part of second thoracic leg of the female from the "Ingolf" Stat. 22, from the outer side;  $\times$  100.
  - 1e. Left sixth thoracic leg of the subadult male, from the inner side;  $\times$  59.
  - 1f. Abdomen with second left pleopod and left uropod of the female, from the left side;  $\times$  32.
- The other pleopods omitted.

Fig. 2. *Leptognathia Amdrupii* n. sp.

- Fig. 2a. Left antennula of a female with marsupium, from the outer side;  $\times$  60.
- 2b. Left cheliped of the same female, from the outer side;  $\times$  60.
  - 2c. Left second thoracic leg of the same female, from the outer side;  $\times$  60.

Fig. 3. *Leptognathia tuberculata* n. sp.

- Fig. 3a. Cephalothorax and second thoracic segment of a female without marsupium, from the left side;  $\times$  56.
- 3b. Left second thoracic leg of a female with marsupium, from the outer side;  $\times$  83.
  - 3c. Left sixth thoracic leg of the last-named female, from the inner side;  $\times$  83.
  - 3d. Abdomen with first, third and fifth left pleopod and left uropod of a female, from the left side;  $\times$  48.
  - 3e. Left first pleopod of the female, from behind;  $\times$  140.
  - 3f. Left first pleopod of a subadult male, from in front;  $\times$  140.

Fig. 4. *Leptognathia uncinata* n. sp.

- Fig. 4a. Left antennula of a female without marsupium, from the outer side;  $\times$  93.
- 4b. Left cheliped of the same specimen, from the outer side;  $\times$  93.
  - 4c. Left second thoracic leg of the same specimen, from the outer side;  $\times$  93.
  - 4d. Portion of abdomen with left fourth pleopod of the same female, from the outer side;  $\times$  88.
  - 4e. End of abdomen with left uropod of the same female, from the left side;  $\times$  93.
  - 4f. Major part of cephalothorax with appendages of an adult male, from the left side;  $\times$  83.
  - 4g. Left second thoracic leg of the same male, from the outer side;  $\times$  83.
  - 4h. Major part of left sixth thoracic leg of the same male;  $\times$  83.
  - 4i. Two posterior abdominal segments with left uropod of the same male, from the outer side;  $\times$  83.

Fig. 5. *Leptognathia manca* G. O. Sars.

- Fig. 5a. Cephalothorax and second segment of a female without marsupium, from the left side;  $\times$  86.
- 5b. Abdomen of a female with marsupium, from the left side;  $\times$  86.



Fig. 5c. Cephalothorax of a subadult male, from the left side;  $\times 86$ .

- 5d. Last thoracic segment (leg omitted) and abdomen with left uropod and fourth left pleopod — the other pleopods omitted — of the same subadult male, from the left side;  $\times 60$ .

Fig. 6. *Leptognathia subaequalis* n. sp.

Fig. 6a. Female without marsupium from the "Ingolf" Stat. 139, from above;  $\times 34$ .

- 6b. Cephalothorax and second segment with appendages of a female with marsupium from the same station, from the left side;  $\times 89$ .
- 6c. Left cheliped of another female from the same station, from the outer side;  $\times 135$ .
- 6d. Three posterior abdominal segments of the female shown in fig. 6b, from the left side;  $\times 89$ .
- 6e. Four posterior abdominal segments with pleopods and left uropod of an immature male or more probably a female without marsupium from the "Ingolf" Stat. 4, from the left side;  $\times 89$ .
- 6f. Left antennula and antenna of a subadult male from the "Ingolf" Stat. 139, from the left side;  $\times 89$ .

Fig. 7. *Leptognathia ventralis* n. sp.

Fig. 7a. Female without marsupium from the "Ingolf" Stat. 115, from above;  $\times 27$ .

- 7b. Cephalothorax and second segment — only the basal part of its left leg drawn — of a female with marsupium from the same station, from the left side;  $\times 86$ .
- 7c. Mandibles of an immature male, from above;  $\times 142$ . *l.* left mandible.
- 7d. Maxillipeds of the last-named specimen, from below;  $\times 142$ .
- 7e. Left third thoracic leg of a female with marsupium from Stat. 115, from the outer side;  $\times 86$ .
- 7f. Left seventh thoracic leg of the same female, from the outer side;  $\times 86$ .
- 7g. Abdomen of a female from Stat. 115, from the left side;  $\times 59$ .
- 7h. Left second thoracic leg of a female without marsupium from Stat. 38, from the outer side;  $\times 86$ .
- 7i. Cephalothorax and second segment with appendages of a subadult male from Stat. 115, from the left side;  $\times 86$ .
- 7k. Three posterior abdominal segments with left pleopods and uropod of a subadult male, from the outer side;  $\times 86$ .

### Plate IX.

Fig. 1. *Leptognathia tenella* n. sp.

Fig. 1a. Female without marsupium, from above;  $\times 33$ .

- 1b. Cephalothorax and second thoracic segment of a female without marsupium, from the left side;  $\times 95$ .
- 1c. Left seventh thoracic leg of the same female, from the outer side;  $\times 95$ .
- 1d. Abdomen of the same female, from the left side;  $\times 95$ .
- 1e. Three posterior abdominal segments of the female shown in fig. 1a, from above;  $\times 84$ . Setae of right uropod omitted.

Fig. 2. *Leptognathia acanthifera* n. sp.

Fig. 2a. Female without marsupium, from above;  $\times 31$ .

- Fig. 2b. Cephalothorax and the two following segments of a female without marsupium, from the left side;  $\times 84$ .
- 2c. Left fifth thoracic leg, from the outer side;  $\times 84$ .
- 2d. Abdomen of the female shown in fig. 2b, from the left side;  $\times 84$ .

Fig. 3. *Leptognathia brevivensis* Lilljeborg.

- Fig. 3a. Cephalothorax and second thoracic segment of a female without marsupium from the "Ingolf" Stat. 117, from the left side;  $\times 83$ . A minute parasitic Copepod is attached to the outer side of second joint of second thoracic leg.
- 3b. Four posterior abdominal segments with left fourth pleopod and left uropod of the above-named female, from the left side;  $\times 83$ .
- 3c. Abdomen of an ovigerous female from Norway, from the left side;  $\times 83$ . Pleopods excepting the third and the setae of the uropod omitted.
- 3d. Anterior part with appendages of an adult male from the "Ingolf" Stat. 36, from the left side;  $\times 84$ .
- 3e. Left sixth thoracic leg of the same male, from the outer side;  $\times 84$ .
- 3f. Sixth and seventh thoracic and all abdominal segments of the same male, from the left side;  $\times 84$ . Thoracic legs and the pleopods of first, second and fourth abdominal segments omitted.
- 3g. Sixth abdominal segment with left uropod of an adult male from the "Ingolf" Stat. 101 from the left side;  $\times 80$ .

Fig. 4. *Leptognathia crassa* n. sp.

- Fig. 4a. Female without marsupium, from above;  $\times 29$ .
- 4b. Cephalothorax and second thoracic segment with appendages of a female, from the left side;  $\times 60$ .
- 4c. Left sixth thoracic leg of another female, from the outer side;  $\times 79$ .
- 4d. Abdomen of the female shown in fig. 4b from the left side;  $\times 60$ . Pleopods omitted excepting the third.
- 4e. Three posterior abdominal segments of the last-named female, from below;  $\times 60$ . The pleopods on the left side of the figure omitted.

Fig. 5. *Leptognathia polita* n. sp.

- Fig. 5a. Female without marsupium, from above;  $\times 17$ .
- 5b. Cephalothorax and second thoracic segment of the same female, from the left side;  $\times 36$ . Left second thoracic leg omitted excepting its most proximal part.
- 5c. Major part of left chela of the same specimen, from the outer side;  $\times 80$ .
- 5d. Right second thoracic leg of the same female, from the outer side;  $\times 50$ .
- 5e. Left sixth thoracic leg of the same female, from the outer side;  $\times 50$ .
- 5f. Five posterior abdominal segments with left fifth pleopod and left uropod of the same specimen, from the outer side;  $\times 36$ .

Fig. 6. *Leptognathia vicina* n. sp.

- Fig. 6a. Subadult male from the "Ingolf" Stat. 28, from above;  $\times 25$ .
- 6b. Cephalothorax and second thoracic segment with appendages of a female without marsupium from the same station, from the left side;  $\times 57$ .
  - 6c. Mandibles of a female, from below;  $\times 90$ . *l.* left mandible.
  - 6d. Molar processes of the same mandibles, from below;  $\times 315$ .
  - 6e. Left maxillula of the same female, from below;  $\times 90$ .
  - 6f. Left cheliped, removed from the animal and seen from the outer side;  $\times 65$ .
  - 6g. Right sixth thoracic leg of a female, from the outer side;  $\times 57$ .
  - 6h. Four posterior abdominal segments with fourth pleopod and left uropod of the female shown in fig. 4b, from the outer side;  $\times 57$ .
  - 6i. Left antennula of a subadult male from Lat.  $66^{\circ} 49' N$ , Long.  $56^{\circ} 28' W$ , from the left side;  $\times 82$ .

## Plate X.

Fig. 1. *Leptognathia profunda* n. sp.

- Fig. 1a. Female without marsupium, from above;  $\times 26$ .
- 1b. Anterior half of a female without marsupium, from the left side;  $\times 56$ .
  - 1c. Left cheliped of another female, from the outer side;  $\times 97$ .
  - 1d. Left second thoracic leg of a third female, from the outer side;  $\times 97$ .
  - 1e. Left sixth thoracic leg of the last-named specimen, from the outer side — distal half of the leg somewhat turned;  $\times 97$ .
  - 1f. Left first pleopod of a female, from in front;  $\times 95$ .
  - 1g. Four posterior abdominal segments with appendages of the female shown in fig. 1b, from the left side;  $\times 56$ .
  - 1h. Left uropod of another female, from the outer side;  $\times 97$ .

Fig. 2. *Leptognathia latiremis* n. sp.

- Fig. 2a. Female without marsupium from the "Ingolf" Stat. 58, from above;  $\times 26$ .
- 2b. Left antennula and antenna of a female without marsupium from the same station, from the outer side;  $\times 86$ .
  - 2c. Left antennula of the female shown in fig. 2a, from above;  $\times 48$ .
  - 2d. Left antennula of an immature male from the same station, from above;  $\times 48$ .
  - 2e. Labrum and both mandibles of a female; from below;  $\times 235$ .
  - 2f. Maxillipeds of the last-named specimen, from below;  $\times 235$ .
  - 2g. Left cheliped of a female without marsupium, from the outer side;  $\times 86$ .
  - 2h. Distal part of left second thoracic leg of the last-named specimen, from the outer side;  $\times 86$ .
  - 2i. Left third thoracic leg of the last-named specimen, from the outer side;  $\times 86$ .
  - 2k. Left seventh thoracic leg of the same specimen, from the outer side;  $\times 86$ . The distal half of the leg somewhat turned.

- Fig. 21. First left pleopod of a female, from in front;  $\times 86$ .  
 — 2m. Posterior part of abdomen with right uropod of a female, from above;  $\times 52$ .  
 — 2n. Posterior part of abdomen of a young specimen with the seventh pair of thoracic legs and the pleopods still wanting, from the left side;  $\times 86$ .

Fig. 3. *Leptognathia glacialis* n. sp.

- Fig. 3a. Distal half of left cheliped, from the outer side;  $\times 86$ .  
 — 3b. Three posterior abdominal segments, from the left side;  $\times 86$ .

Fig. 4. *Haplocope linearis* n. sp.

- Fig. 4a. A full-grown female, from above;  $\times 32$ . The right uropod in this specimen was abnormally short.  
 — 4b. Cephalothorax and second thoracic segment with appendages of a female without marsupium, from the left side;  $\times 90$ .  
 — 4c. Mandibles of a female, from below;  $\times 200$ . *l.* left mandible.  
 — 4d. Right sixth thoracic leg of the female shown in fig. 4b, from the outer side;  $\times 90$ .  
 — 4e. Third left pleopod of a female with marsupium, from in front;  $\times 108$ .  
 — 4f. Major part of abdomen with fourth and fifth left pleopod — the other pleopods omitted — and left uropod of a female with marsupium, from the left side;  $\times 75$ .

Fig. 5. *Leptognathiella abyssi* n. gen., n. sp.

- Fig. 5a. Female without marsupium, from above;  $\times 26$ .  
 — 5b. Anterior part of the same female, from above;  $\times 56$ .  
 — 5c. Abdomen and posterior part of the thorax of the same female, from above;  $\times 44$ .  
 — 5d. Left antennula and antenna of a female, from the outer side;  $\times 82$ .  
 — 5e. Left sixth thoracic leg of a female, from the outer side;  $\times 82$ .  
 — 5f. Abdomen and major part of last thoracic segment of a female, from the left side;  $\times 56$ .  
 — 5g. Cephalothorax and two anterior thoracic segments with appendages of a subadult male, from the left side;  $\times 82$ .  
 — 5h. Left fifth thoracic leg of the subadult male, from the outer side;  $\times 82$ .  
 — 5i. Abdomen with fourth and fifth left pleopod and uropod of the subadult male;  $\times 56$ . Anterior pairs of pleopods omitted.

Fig. 6. *Cryptocope Voringii* G. O. Sars.

- Fig. 6a. Cephalothorax of a female without marsupium from the "Ingolf" Stat. 138, from the left side;  $\times 31$ .  
 6b. Distal part of the chela of the same female, from the outer side;  $\times 53$ .  
 6c. Left third thoracic leg of the same female, from the outer side;  $\times 31$ .  
 6d. Abdomen of the same female without marsupium, from the left side;  $\times 31$ .

## Plate XI.

Fig. 1. *Cryptocope arctica* H. J. Hansen.

- Fig. 1a. Female without marsupium from the "Ingolf" Stat. 25, from above;  $\times 26$ .
- 1b. Cephalothorax and second thoracic segment with appendages of an ovigerous female from Henry Land, from the left side;  $\times 47$ .
- 1c. Left chela of a female without marsupium from the "Ingolf" Stat. 25, from the outer side;  $\times 77$ .
- 1d. Left sixth thoracic leg of the last-named specimen, from the outer side;  $\times 50$ .
- 1e. Abdomen and last thoracic segment of the female shown in fig. 1b, from the left side;  $\times 47$ .  
The thoracic leg excepting its basal part and second, third and fourth left pleopod omitted.
- 1f. Abdomen with small pleopods — second, third and fourth pleopod omitted — of a large female without marsupium from the "Ingolf" Stat. 25, from the left side;  $\times 52$ .
- 1g. Left antennula of a subadult male from Henry Land, from the left side;  $\times 47$ .
- 1h. Abdomen — left second, third and fifth pleopod omitted — and posterior part of the thorax of a subadult male from Henry Land, from the left side;  $\times 47$ .

Fig. 2. *Cryptocope arctophylax* Norm. & Stebb.

- Fig. 2a. Subadult male from Stat. 24, from above;  $\times 16$ .
- 2b. Left antennula of the same subadult male, from the outer side;  $\times 57$ .
- 2c. Major part of left chela of the same subadult male, from the outer side;  $\times 56$ .
- 2d. Abdomen — first, second and fourth pleopod omitted — and seventh thoracic segment of the same subadult male, from the left side;  $\times 32$ .
- 2e. Left antennula and antenna of an immature female from Stat. 24, from the left side;  $\times 57$ .
- 2f. Distal part of left sixth thoracic leg of the same immature female, from the outer side;  $\times 80$ .
- 2g. Abdomen and end of thorax of the same immature female, from the left side;  $\times 36$ .
- 2h. Cephalothorax and anterior part of thorax of an adult male from Stat. 36, from the left side;  $\times 35$ .
- 2i. Left chela of the adult male, from the outer side;  $\times 61$ .
- 2k. Major part of abdomen — the three anterior pleopods omitted — of the same adult male, from the left side;  $\times 33$ .

Fig. 3. *Tanaella ochracea* n. sp.

- Fig. 3a. Female without marsupium, from above;  $\times 21$ .
- 3b. Cephalothorax and the two anterior thoracic segments with appendages of the same female, from the left side;  $\times 46$ .
- 3c. Major part of left chela of the same specimen, from the outer side;  $\times 85$ .
- 3d. Distal part of left third thoracic leg of the same female, from the outer side;  $\times 80$ .
- 3e. Left seventh thoracic leg of the same female, from behind;  $\times 80$ .
- 3f. Abdomen — first, third and fourth pleopod omitted — and seventh thoracic segment of the same female;  $\times 32$ .

Fig. 4. *Tanaella unguicillata* Norm. & Stebb.

- Fig. 4a. Cephalothorax and two anterior thoracic segments with appendages of a female without marsupium, from the left side;  $\times 40$ .
- 4b. Major part of left chela of the same female, from the outer side;  $\times 85$ .
- 4c. Left sixth thoracic leg of the same female, from in front;  $\times 80$ .
- 4d. Last thoracic segment and abdomen of the same female, from the left side;  $\times 31$ .

Fig. 5. *Strongylura minima* n. sp.

- Fig. 5a. Subadult male, from above;  $\times 55$ .
- 5b. Cephalothorax and two anterior thoracic segments with appendages of the subadult male, from the left side;  $\times 95$ .
- 5c. Four posterior abdominal segments — third and fourth left pleopod omitted — from the side;  $\times 95$ .
- 5d. Cephalothorax of a female without marsupium, from the left side;  $\times 91$ .

## Plate XII.

Fig. 1. *Strongylura cylindrata* G. O. Sars.

- Fig. 1a. Female without marsupium from the "Ingolf" Stat. 113, from above;  $\times 14$ .
- 1b. Cephalothorax of a female without marsupium from the "Ingolf" Stat. 113, from the left side;  $\times 52$ .
- 1c. Left third thoracic leg of the female from Stat. 113, from the outer side;  $\times 81$ .
- 1d. Left seventh thoracic leg of the female from Stat. 113, from the outer side;  $\times 81$ .
- 1e. Cephalothorax and second thoracic segment of the subadult male from the "Ingolf" Stat. 24, from the left side;  $\times 60$ .
- 1f. Posterior part of abdomen of the subadult male from Stat. 24, from the left side;  $\times 60$ .
- 1g. Left antennula and antenna of a female without marsupium from Norway, from the left side;  $\times 60$ .
- 1h. Left second thoracic thoracic leg of the same female from Norway, from the outer side;  $\times 81$ .
- 1i. Left sixth thoracic leg of the same female from Norway, from behind;  $\times 81$ .
- 1k. Last abdominal segment of the same female from Norway, from the left side;  $\times 58$ .
- 1l. Left pleopod of the abdomen shown in fig. 1k, from the outer side;  $\times 175$ .

Fig. 2. *Strongylurella indivisa* n. gen., n. sp.

- Fig. 2a. Female without marsupium, from above;  $\times 36$ .
- 2b. Cephalothorax and second thoracic segment of the same specimen, from the left side;  $\times 91$ .
- 2c. Left sixth thoracic leg of the same specimen, from the outer side;  $\times 91$ .
- 2d. Five abdominal segments of the same female, from the left side;  $\times 80$ .
- 2e. Four posterior abdominal segments of the same female, from above;  $\times 54$ .

Fig. 3. *Paranarthrura insignis* n. gen., n. sp.

- Fig. 3a. Female without marsupium from the "Ingolf" Stat. 25, from above;  $\times 21$ .

- Fig. 3b. Cephalothorax and anterior thoracic segments of a female without marsupium from the same station, from the left side;  $\times 56$ .
- 3c. Labrum and mandibles of a female, from below;  $\times 130$ .
  - 3d. Both mandibles in another position, from below;  $\times 200$ .
  - 3e. Left maxillula of the last-named female, from below;  $\times 130$ .
  - 3f. Maxillipeds — epipods omitted — of the same female, from below;  $\times 130$ .
  - 3g. Left seventh thoracic leg of an ovigerous female, from behind;  $\times 56$ .
  - 3h. Seventh thoracic segment — the leg omitted — and abdomen of a female, from the left side;  $\times 47$ .
  - 3i. Seventh thoracic segment and abdomen of a female, from above;  $\times 42$ .
  - 3k. Left antennula and antenna of a subadult male from Stat. 25, from the left side;  $\times 56$ .
  - 3l. Left cheliped of a subadult male, from the left side;  $\times 81$ .
  - 3m. Seventh thoracic segment and abdomen of a subadult male from Stat. 25, from the left side;  $\times 47$ . Left thoracic leg and third and fourth pleopods omitted.

Fig. 4. *Paranarthrura subtilis* n. sp.

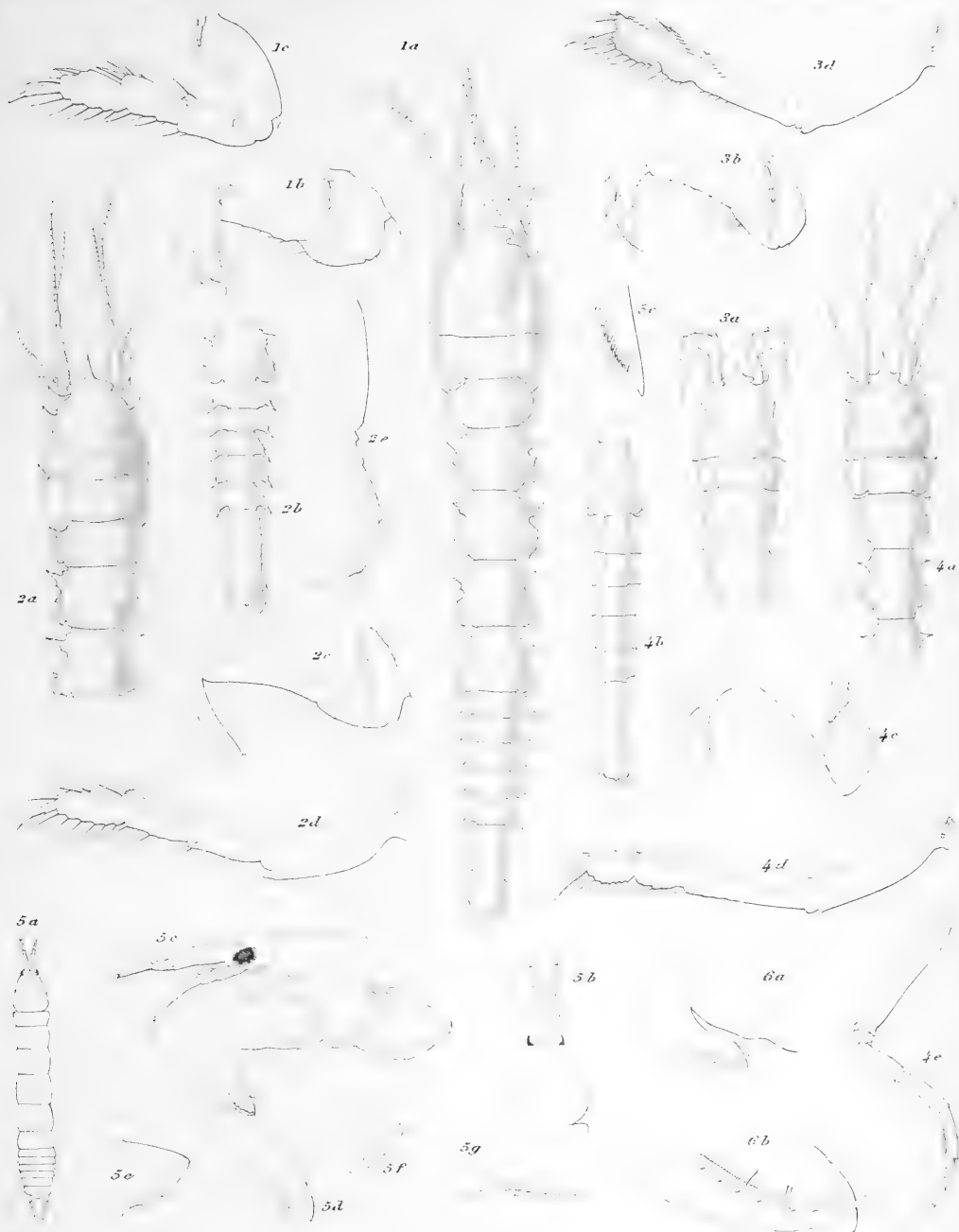
- Fig. 4a. Female without marsupium, from above  $\times 34$ .
- 4b. Cephalothorax and second thoracic segment with appendages of a female without marsupium, from the left side;  $\times 89$ .
  - 4c. Seventh thoracic segment and abdomen of the same female without marsupium, from the left side;  $\times 89$ .
  - 4d. Seventh thoracic segment and abdomen of another female without marsupium, from above;  $\times 89$ .

Fig. 5. *Paranarthrura clavipes* n. sp.

- Fig. 5a. Young specimen with the seventh thoracic segment only half developed, from above;  $\times 35$ .
- 5b. Cephalothorax and second left leg of an immature male, from the left side;  $\times 82$ .
  - 5c. Abdomen and posterior part of the thorax of the same immature male, from the left side;  $\times 82$ . Major part of sixth leg and first, second and fourth pleopod omitted.



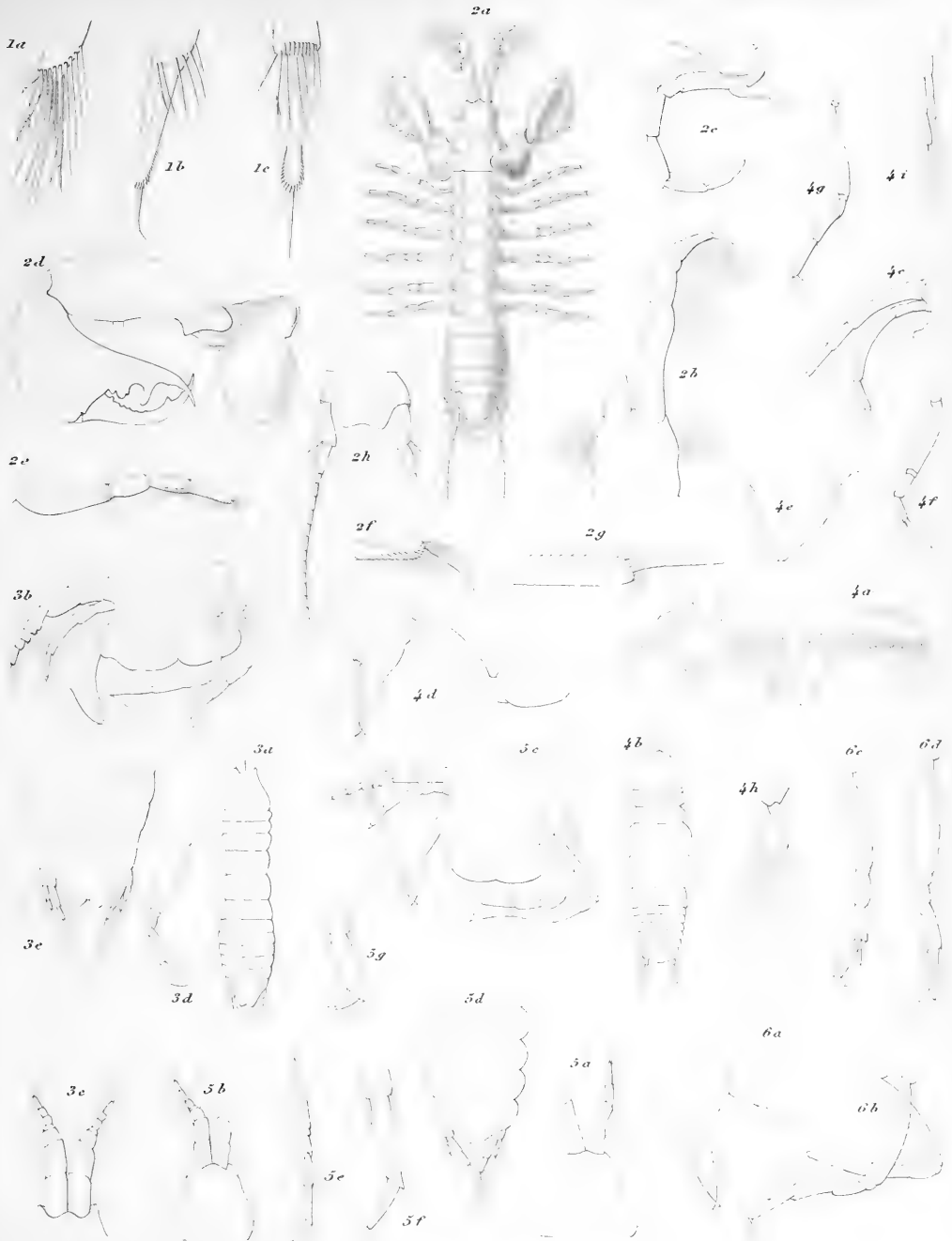




1. *Apseudes vicinus* n. sp. 2. *A. tenuis* n. sp. 3. *A. gracilis* Norm. & Stebb. 4. *A. gracillimus* n. sp.

5. *Heterotanais groenlandicus* n. sp. 6. *Neotanais serratispinosus* Norm. & Stebb.

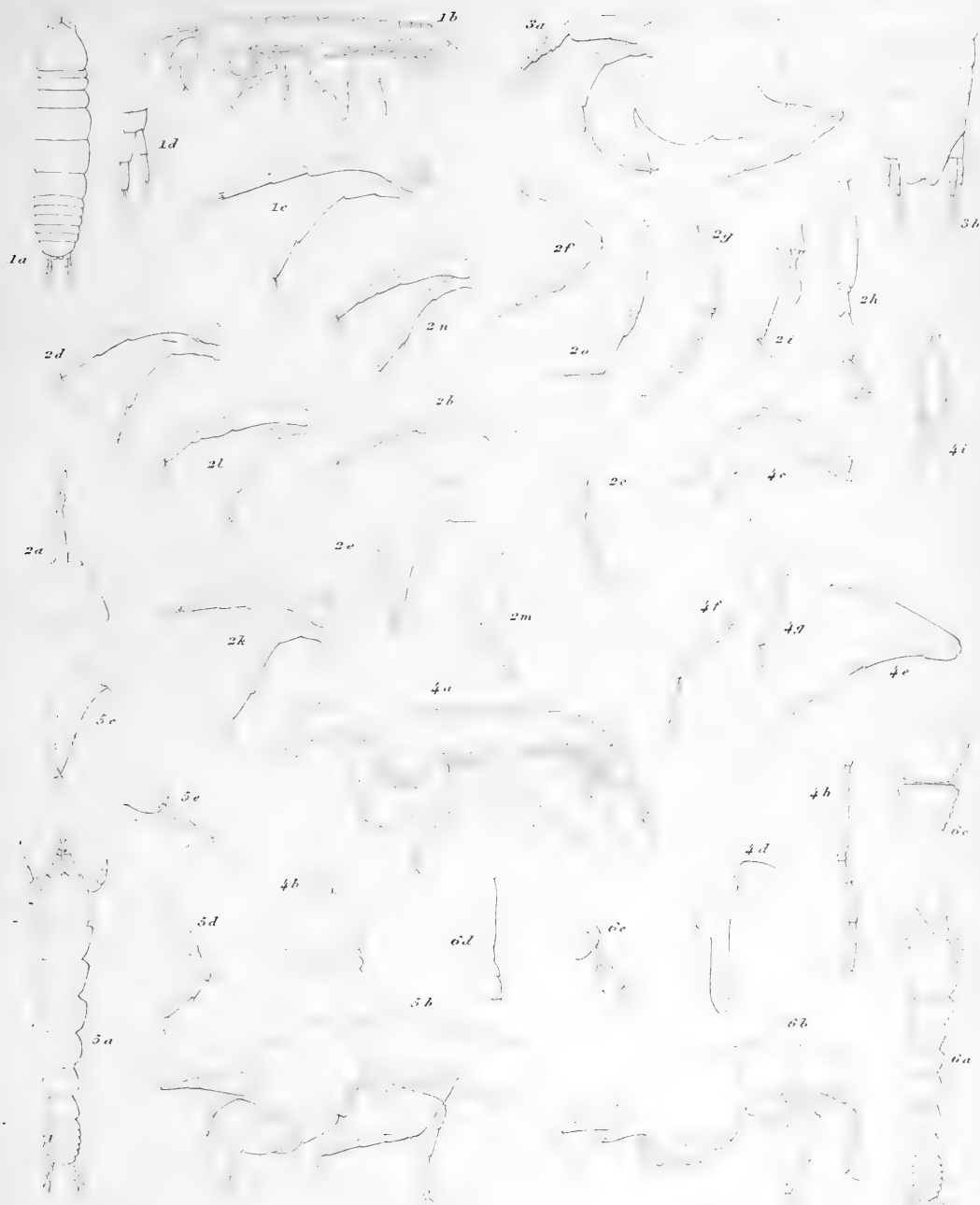




1. *Neotanaïs serratispinosus* Norm. & Stebb. 2. *N. giganteus* n.sp. 3. *Pseudotanaïs forcipatus* Liljeb.

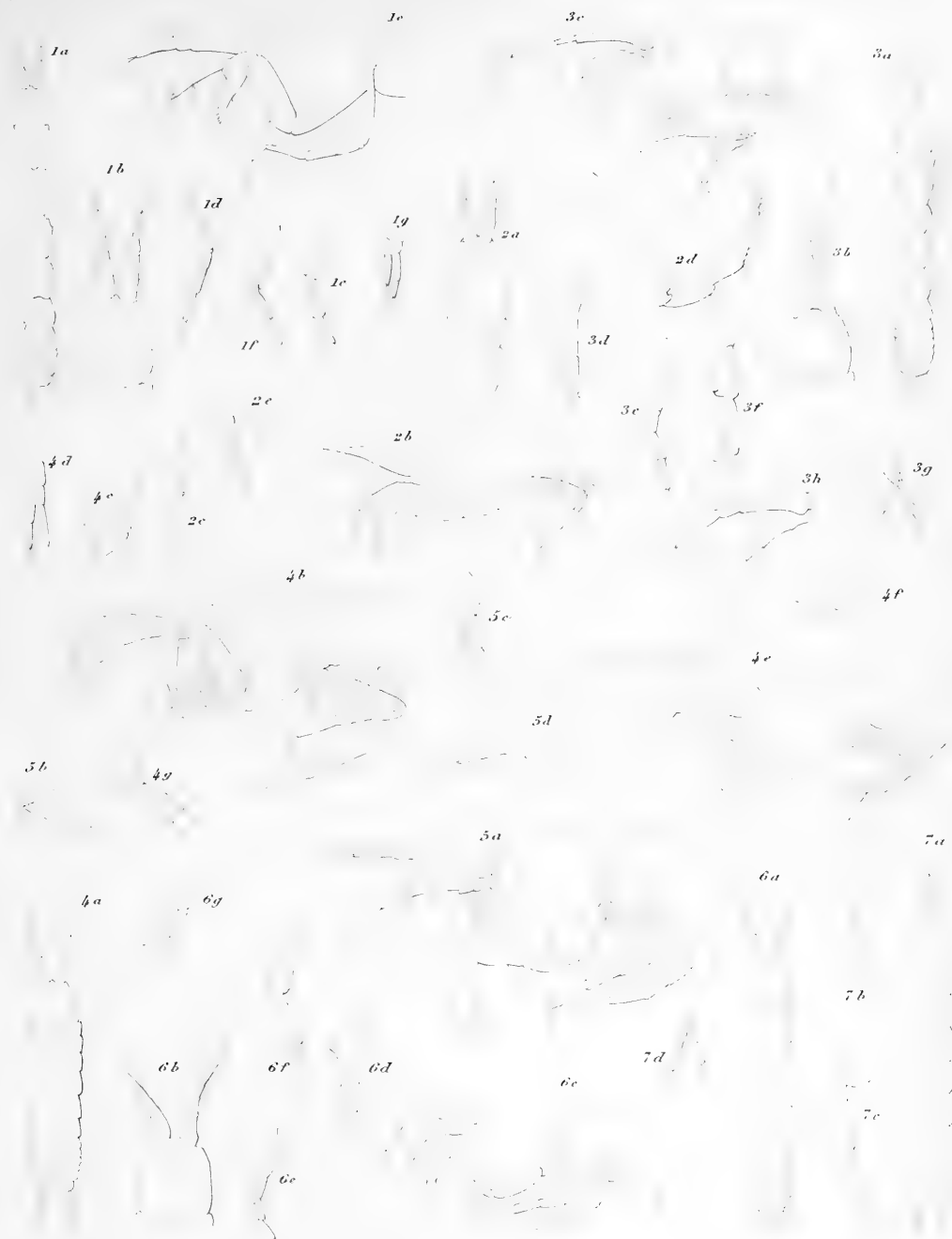
4. *P. abyssi* n.sp. 5. *P. Lilljeborgii* G.O.S. 6. *P. oculatus* n.sp.





1. *Pseudotanaia oculatus* n.sp.    2. *P. affinis* H.J.H.    3. *P. affinis* H.J.H. 5 od.  
 4. *P. longipes* n.sp.    5. *Typhlotanaia irregularis* n.sp.    6. *T. macrocephala* n.sp.



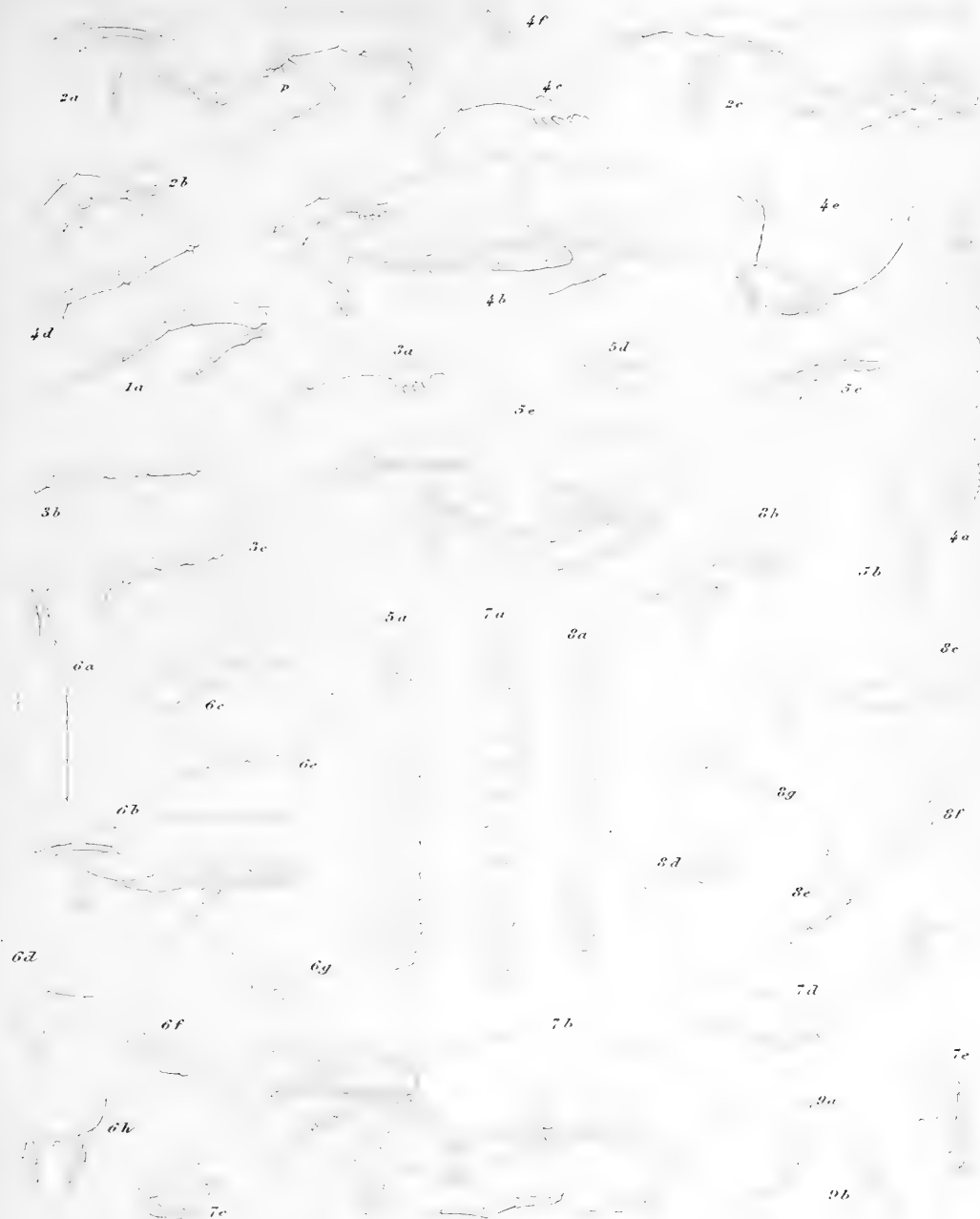


1. *Typhlotanais pulcher* n. sp. 2. *T. gracilipes* n. sp. 3. *T. mucronatus* n. sp. 4. *T. eximius* n. sp.

5. *T. penicillatus* G.O.S. 6. *T. inermis* n. sp. 7. *T. variabilis* n. sp.







1. *Typhlotanaeis mucronatus* n. sp.    2. *T. variabilis* n. sp.    3. *T. tenuicornis* G.O.S.    4. *T. trispinosus* n. sp.  
 5. *T. profundus* n. sp.    6. *T. spinicauda* n. sp.    7. *T. grandis* n. sp.    8. *T. plebejus* n. sp.    9. *T. inequipes* n. sp.





1. *Typhlotanais inaequipes* n. sp. 2. *T. finmarchicus* a. d. s. 3. *T. mixtus* n. sp. 4. *T. solidus* n. sp.  
 5. *Agathotanaia Ingolfi* n. gen. n. sp. 6. *Leptognathia multiserrata* n. sp. 7. *L. Sarsii* HJH.





1 *Leptognathia gracilis* Kr. 2. *L. Hanseni* Vankollen. 3. *L. longiremis* Liljeb. 4. *L. inermis* n. sp.

5. *L. brachiata* n. sp. 6. *L. alba* n. sp. 7. *L. hastata* n. sp.

H. Hansen del.

T. N. Møller sc.





1. *Leptognathia armata* n. sp. 2. *L. Andrupii* n. sp. 3. *L. tuberculata* n. sp. 4. *L. uncinata* n. sp.  
5. *L. manca* a. o. s. 6. *L. subaqualis* n. sp. 7. *L. ventralis* n. sp.

H. J. Hansen del.

T. K. Möller sc.



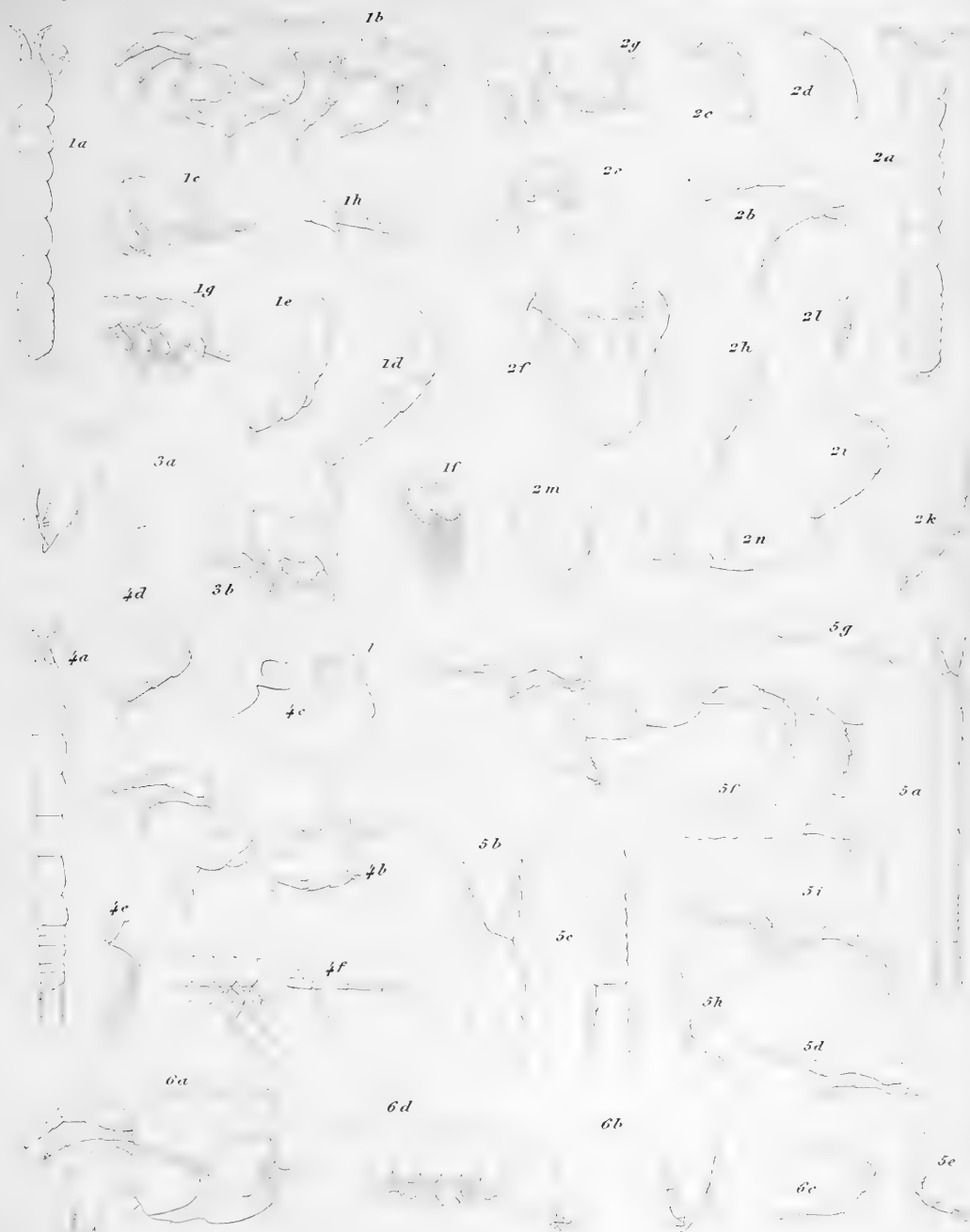




1. *Leptognathia tenella* n. sp. 2. *L. acanthifera* n. sp. 3. *L. breviremis* Lilljeb. 4. *L. crassa* n. sp.

5. *L. polita* n. sp. 6. *L. vicina* n. sp.

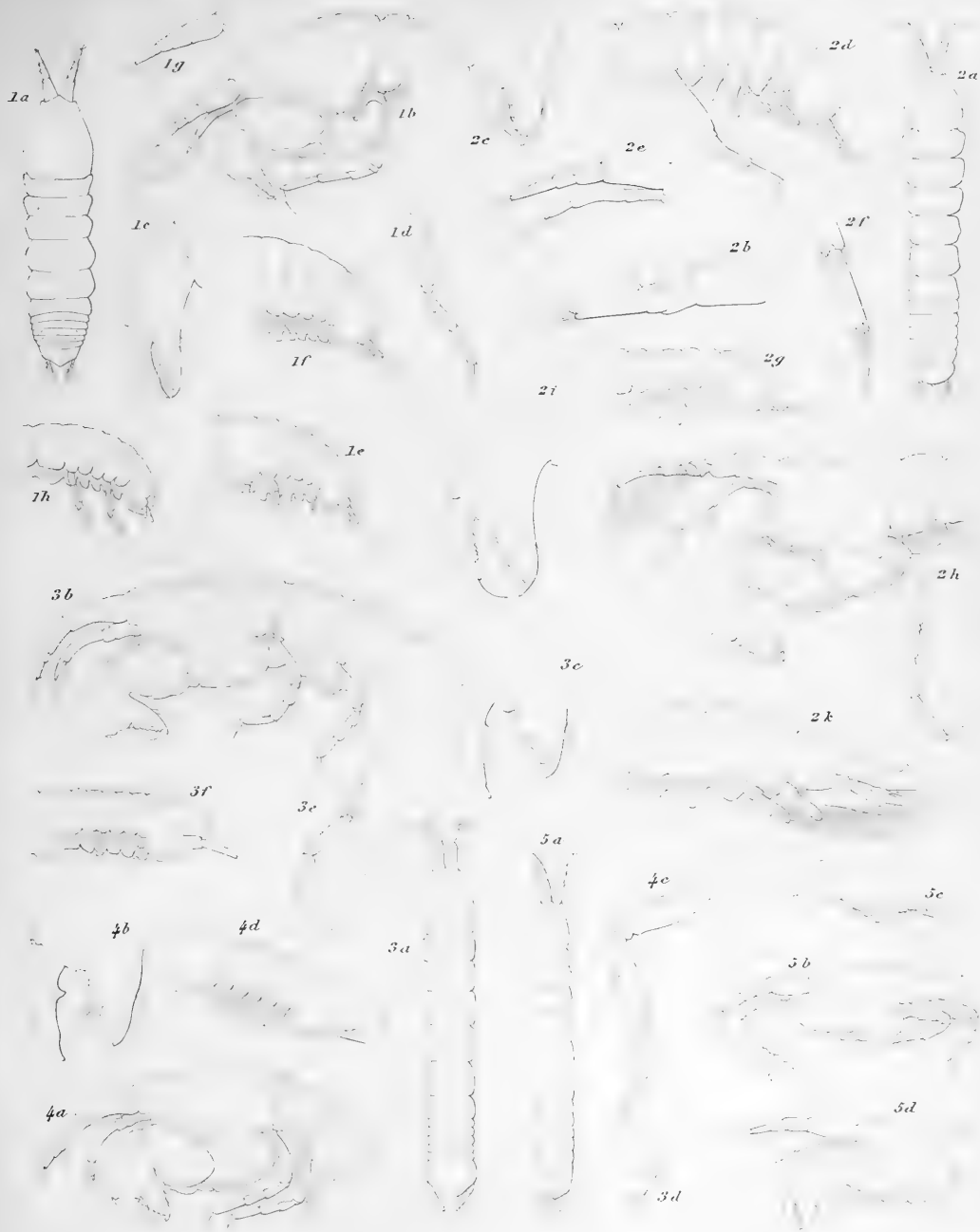




1. *Leptognathia profunda* n. sp. 2. *L. latiremis* n. sp. 3. *L. glacialis* n. sp. 4. *Haplocope linearis* n. sp.

5. *Leptognathiella abyssii* n. gen., n. sp. 6. *Cryptocope Vöringii* G.O.S.

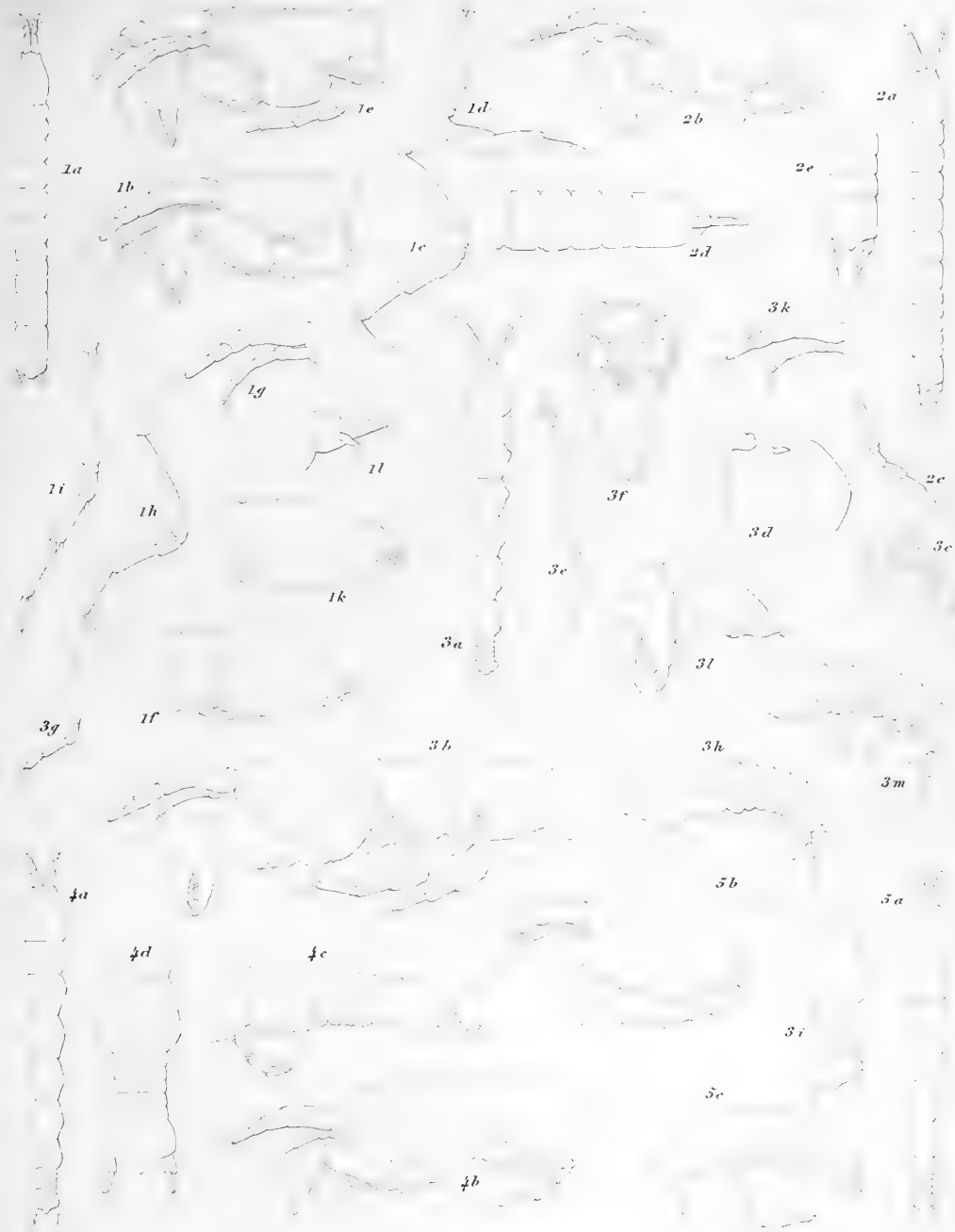




1. *Cryptocope arctica* H.J.H. 2. *C. arctophylax* Norm. & Stebb. 3. *Tanaella ochracea* n. sp.

4. *T. unguicillata* Norm. & Stebb. 5. *Strongylura minima* n. sp.





1. *Strongylura cylindrata* a.o.s. 2. *Strongylurella indivisa* n. gen., n. sp. 3. *Paranarthrura insignis* n. gen., n. sp.

4. *P. subtilis* n. sp. 5. *P. clavipes* n. sp.

H. J. Hansen del.

T. N. Møller scul.





# THE INGOLF-EXPEDITION

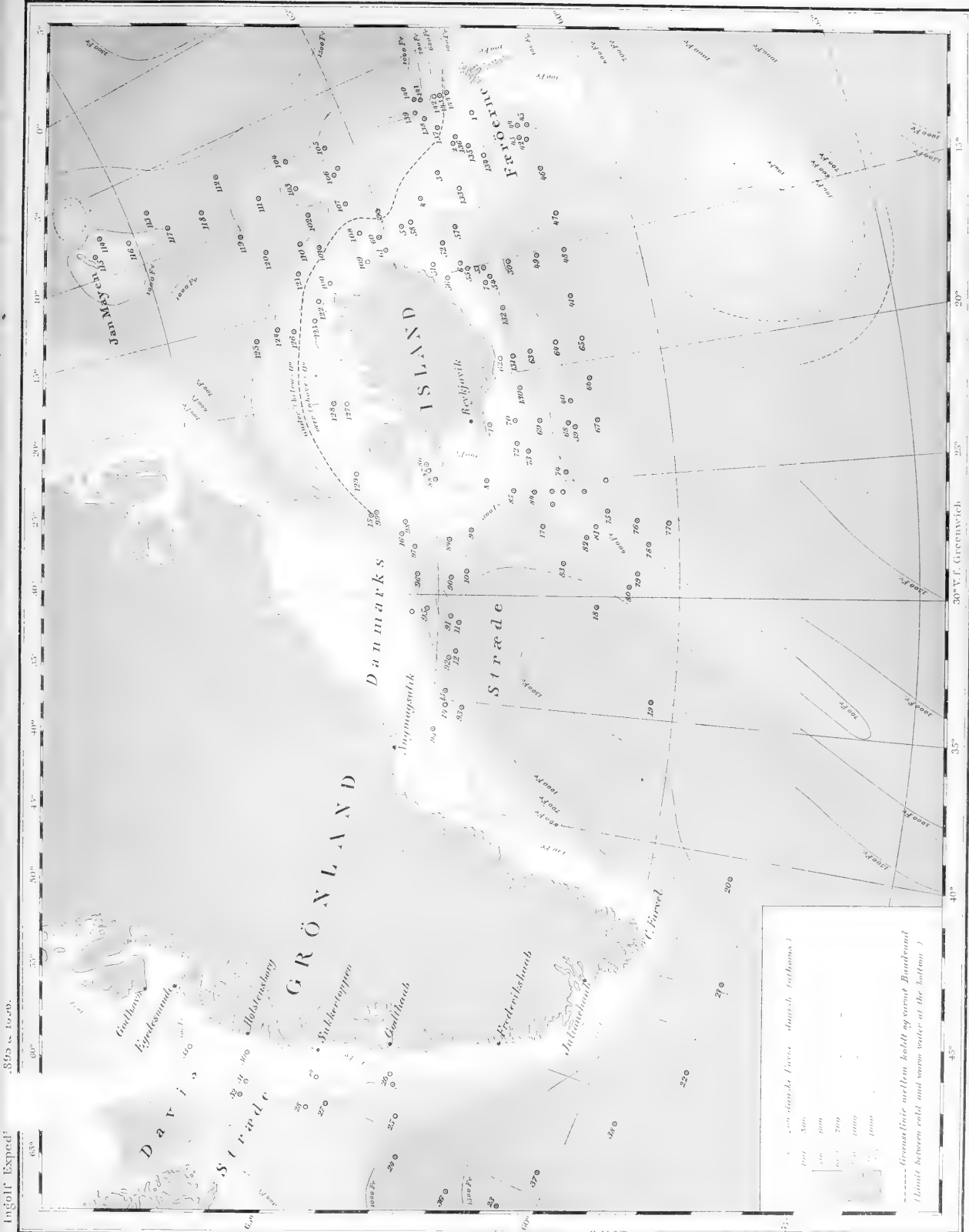
1895—1896.

## THE LOCALITIES, DEPTHS, AND BOTTOMTEMPERATURES OF THE STATIONS.

Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom- temp.	Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom- temp.	Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom- temp.
1	62° 30'	8° 21'	132	7°2	24	63° 06'	56° 00'	1199	2°4	45	61° 32'	9° 43'	643	4°17
2	63° 04'	9° 22'	262	5°3	25	63° 30'	54° 25'	582	3°3	46	61° 32'	11° 36'	720	2°40
3	63° 35'	10° 24'	272	0°5		63° 51'	53° 03'	136		47	61° 32'	13° 40'	950	3°23
4	64° 07'	11° 12'	237	2°5	26	63° 57'	52° 41'	34	0°6	48	61° 32'	15° 11'	1150	3°17
5	64° 40'	12° 09'	155			64° 37'	54° 24'	109		49	62° 07'	15° 07'	1120	2°91
6	63° 43'	14° 34'	90	7°0	27	64° 54'	55° 10'	393	3°8	50	62° 43'	15° 07'	1020	3°13
7	63° 13'	15° 41'	600	4°5	28	65° 14'	55° 42'	420	3°5	51	64° 15'	14° 22'	68	7°32
8	63° 56'	24° 40'	136	6°0	29	65° 34'	54° 31'	68	0°2	52	63° 57'	13° 32'	420	7°87
9	64° 18'	27° 00'	295	5°8	30	66° 50'	54° 28'	22	1°05	53	63° 15'	15° 07'	795	3°08
10	64° 24'	28° 50'	788	3°5	31	66° 35'	55° 54'	88	1°6	54	63° 08'	15° 40'	691	3°9
11	64° 34'	31° 12'	1300	1°6	32	66° 35'	56° 38'	318	3°9	55	63° 33'	15° 02'	316	5°9
12	64° 38'	32° 37'	1040	0°3	33	67° 57'	55° 30'	35	0°8	56	64° 00'	15° 09'	68	7°57
13	64° 47'	34° 33'	622	3°0	34	65° 17'	54° 17'	55		57	63° 37'	13° 02'	350	3°4
14	64° 45'	35° 05'	176	4°4	35	65° 16'	55° 05'	362	3°6	58	64° 25'	12° 09'	211	0°8
15	66° 18'	25° 59'	330	—0°75	36	61° 50'	56° 21'	1435	1°5	59	65° 00'	11° 16'	310	—0°1
16	65° 43'	26° 58'	250	6°1	37	60° 17'	54° 05'	1715	1°4	60	65° 09'	12° 27'	124	0°9
17	62° 49'	26° 55'	745	3°4	38	59° 12'	51° 05'	1870	1°3	61	65° 03'	13° 06'	55	0°4
18	61° 44'	30° 29'	1135	3°0	39	62° 00'	22° 38'	865	2°9	62	63° 18'	19° 12'	72	7°92
19	60° 29'	34° 14'	1566	2°4	40	62° 00'	21° 36'	845	3°3	63	62° 40'	19° 05'	800	4°0
20	58° 20'	40° 48'	1695	1°5	41	61° 39'	17° 10	1245	2°0	64	62° 06'	19° 00'	1041	3°1
21	58° 01'	44° 45'	1330	2°4	42	61° 41'	10° 17'	625	0°4	65	61° 33'	19° 00'	1089	3°0
22	58° 10'	48° 25'	1845	1°4	43	61° 42'	10° 11'	645	0°05	66	61° 33'	20° 43'	1128	3°3
23	60° 43'	56° 00'	Only the Pinnion-Net used		44	61° 42'	9° 36'	545	4°8	67	61° 30'	22° 30'	975	3°0

Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom- temp.	Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom- temp.	Station Nr.	Lat. N.	Long. W.	Depth in Danish fathoms	Bottom- temp.
68	62° 06'	22° 30'	843	3°4	92	61° 44'	32° 52'	976	1°4	118	68° 27'	8° 20'	1060	—1°0
69	62° 40'	22° 17'	589	3°9	93	61° 24'	35° 14'	767	1°46	119	67° 53'	10° 19'	1010	—1°0
70	63° 09'	22° 05'	134	7°0	94	61° 56'	36° 19'	204	4°1	120	67° 29'	11° 32'	885	—1°0
71	63° 46'	22° 03'	46			65° 31'	30° 45'	213		121	66° 59'	13° 11'	529	—0°7
72	63° 12'	23° 04'	197	6°7	95	65° 14'	30° 39'	752	2°1	122	66° 42'	14° 44'	115	1°8
73	62° 58'	23° 28'	486	5°5	96	65° 24'	29° 00'	735	1°2	123	66° 52'	15° 40'	145	2°0
74	62° 17'	24° 36'	695	4°2	97	65° 28'	27° 39'	450	5°5	124	67° 40'	15° 40'	495	—0°6
	61° 57'	25° 35'	761		98	65° 38'	26° 27'	138	5°9	125	68° 08'	16° 02'	729	—0°8
	61° 28'	25° 06'	829		99	66° 13'	25° 53'	187	6°1	126	67° 19'	15° 52'	293	—0°5
75	61° 28'	26° 25'	780	4°3	100	66° 23'	14° 02'	59	0°4	127	66° 33'	20° 05'	44	5°6
76	60° 50'	26° 50'	806	4°1	101	66° 23'	12° 05'	537	—0°7	128	66° 50'	20° 02'	194	0°6
77	60° 10'	26° 59'	951	3°6	102	66° 23'	10° 26'	750	—0°9	129	66° 35'	23° 47'	117	6°5
78	60° 37'	27° 52'	799	4°5	103	66° 23'	8° 52'	579	—0°6	130	63° 00'	20° 40'	338	6°55
79	60° 52'	28° 58'	653	4°4	104	66° 23'	7° 25'	957	—1°1	131	63° 00'	19° 09'	698	4°7
80	61° 02'	29° 32'	935	4°0	105	65° 34'	7° 31'	762	—0°8	132	63° 00'	17° 04'	747	4°6
81	61° 44'	27° 00'	485	6°1	106	65° 34'	8° 54'	447	—0°6	133	63° 14'	11° 24'	230	2°2
82	61° 55'	27° 28'	824	4°1		65° 29'	8° 40'	466		134	62° 34'	10° 26'	299	4°1
83	62° 25'	28° 30'	912	3°5	107	65° 33'	10° 28'	492	—0°3	135	62° 48'	9° 48'	270	0°4
	62° 36'	26° 01'	472		108	65° 30'	12° 00'	97	1°1	136	63° 01'	9° 11'	256	4°8
	62° 36'	25° 30'	401		109	65° 29'	13° 25'	38	1°5	137	63° 14'	8° 31'	297	—0°6
84	62° 58'	25° 24'	633	4°8	110	66° 44'	11° 33'	781	—0°8	138	63° 26'	7° 56'	471	—0°6
85	63° 21'	25° 21'	170		111	67° 14'	8° 48'	860	—0°9	139	63° 36'	7° 30'	702	—0°6
86	65° 03'6	23° 47'6	76		112	67° 57'	6° 44'	1267	—1°1	140	63° 29'	6° 57'	780	—0°9
87	65° 02'3	23° 56'2	110		113	69° 31'	7° 06'	1309	—1°0	141	63° 22'	6° 58'	679	—0°6
88	64° 58'	24° 25'	76	6°9	114	70° 36'	7° 29'	773	—1°0	142	63° 07'	7° 05'	587	—0°6
89	64° 45'	27° 20'	310	8°4	115	70° 50'	8° 29'	86	0°1	143	62° 58'	7° 09'	388	—0°4
90	64° 45'	29° 06'	568	4°4	116	70° 05'	8° 26'	371	—0°4	144	62° 49'	7° 12'	276	1°6
91	64° 44'	31° 00'	1236	3°1	117	69° 13'	8° 23'	1003	—1°0					





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3608②











